TRENDS IN EDUCATION

10

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- Curriculum

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- Chemistry
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Education as a Subject

Using Tape Recorders

APRIL 1968

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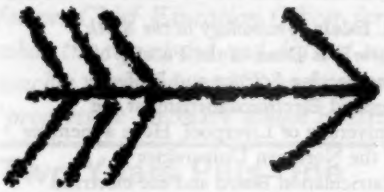

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The Editorial Advisory Board of Trends in Education *consists of senior officers of the Department and senior members of the Inspectorate. The Chief Information Officer is general editor, supported by an executive editor (Martyn Clémans) and an associate editor (David Hopkinson, HMI). Correspondence should be addressed to the executive editor.*

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Plowden—One year later

In our January issue we published the first two articles in a series assessing the Plowden report a year after its publication. Two more articles appear in the present issue. George Taylor, the former Chief Education Officer for Leeds, looks at what the report did and did not say about teacher training; and Trends *goes inside a 'progressive' primary school in Bristol to report.*

Two Years Plus One

GEORGE TAYLOR

Authors are frequently attacked for failing to write the kind of book their critics think they ought to have written. If Lady Plowden and her colleagues on the Central Advisory Council are to be reproached for their failure to consider adequately how teachers should be recruited and trained to carry out the functions so admirably described in their report, it should be noted in their defence that they did not set out to do so. Indeed, they emphasized the urgent need for a separate survey of training. Yet the fact remains that, recognizing that they could not ignore a subject so vital to their brief, the Council sought evidence, examined witnesses and made recommendations on teacher training. It is in the nature of reports of the CAC to be lengthy documents; it is also the practice of most readers to concentrate attention on chapters that lead to significant recommendations. Because the recommendations on teacher training, when not simply platitudinous, are conservative and peripheral, the relative chapter—twenty-five—has received little notice. It is the purpose of this article to examine a chapter which possesses considerable interest, and, in particular, to isolate from its general discussion of teacher training and staffing the special problems of the training and supply of teachers of infants.

Admission of Students to Colleges of Education

In commenting on the secondary education and qualifications of students, the Council clearly appreciated the defects of specialist education. Noting with approval the increased number of entrants with 'A' levels, they deplore the excessive number offering English, history and geography, and regret the dearth of students capable of undertaking main courses in mathematics, science or music. In their view, all teachers in primary schools should be numerate as well as literate, capable of understanding scientific method and with skill in one of the arts. But all the Council suggest is that 'the secondary schools with their specialist tradition in teaching are not . . . sufficiently aware of the needs of primary schools . . . for teachers whose value lies in a marked degree of versatility. The main courses in secondary schools and use of minority time need scrutiny.'

It might have been worth their while to have taken time to investigate how many potential teachers are lost because some fifth formers,

especially girls, are not, though intelligent, attracted to the present 'A' level courses. It would have been more helpful if a positive recommendation had been made for the establishment in secondary schools of more general courses that would provide a better preparation for teaching and other social services—courses that did exist in girls' schools until pressure from colleges for 'A' level passes forced them to an untimely end. Did it occur to the Council that the present tendency to restrict entry to the top four per cent of the ability range may not be necessary, desirable or even possible?

Well aware that the shortage of science and mathematics teachers (a shortage recently accentuated by the transfer, in large numbers, of these specialists to colleges of education) is mainly responsible for innumeracy and lack of understanding of scientific method among applicants, the Council could well have made the point that colleges, instead of erecting artificial barriers such as a demand for an 'O' level pass in mathematics, should be more ready to remedy the weaknesses of students. In this respect, colleges present an example, too familiar among educational institutions, of demanding that the previous stage should produce students tailor-made to their requirements.

On procedures of admission, the Council accepted without pause or comment that the suitability of candidates was a matter for the college principal or his senior colleagues. Adopting Koestler's categories, one can say that, in general, staffs of colleges tend to be *yogis* (intellectuals) and that the majority of teachers in primary schools need to be *commissars* (men and women of action). It is certainly more than likely that in selecting students the former will favour their own type, and that this prejudice should be recognized and corrected. There is, in fact, a passing reference in the report of the practice in a few colleges of inviting heads of primary schools to assist in interviewing. A recommendation that practising teachers and/or LEA advisers should assist at interviews would have been useful.

Referring to the introduction of B.Ed. degrees, the report expresses both hope and anxiety; anxiety, lest the degree should deter students 'from entering primary schools and render them less well-prepared to teach in them': hope, that 'ways will be found of recognising high academic standards, rightly demanded by universities, with relevance to primary education'. To those who regard the BEd as a way of advance in primary education not unaccompanied by dangers, this cautious appraisal will make sense. Among the anxieties not mentioned, one may refer to the likelihood that the introduction of a graduate course will raise the academic standards for all entrants, thereby reducing the opportunities for sixth formers who are eager to teach young children.

Nature of the Course

Every private, it is said, carries a field-marshal's baton in his knapsack; presumably every member of the *corps de ballet* aspires to the *prima ballerina's* dressing-room. But not every teacher, certainly not every woman teacher, hopes to occupy the head's study. Whatever the ambitions of the soldier or dancer may be, their initial training is not designed to equip them for other than their immediate functions. Analysing the various roles for which colleges are preparing teachers, the report states that these range widely from equipping women students (many of whom will soon start their own families) with

constructive and adaptable attitudes towards children and teaching, to preparing the innovators, future heads and LEA advisers. Surprisingly, the report recommends that 'both admission procedure and the courses arranged by colleges must be flexible and imaginative enough to be suited to students who will play these different parts in the educational structure of the future.' Surely, this is too wide and ambitious; initial training for teachers, or for any other occupation with a hierarchical structure, cannot bear the burden of preparing future leaders of the profession. Advanced courses, following a reasonable period of experience in the classroom, are intended to do just that. Because such courses are poorly supported by, and are in short supply for, career primary school teachers, there is no justification for attempting during the initial training to produce teachers capable of filling a variety of roles. In an address to the Association of Science Education, the Duke of Edinburgh aptly described initial training of this nature as operating on the 'clockwork mouse principle' *i.e.* of winding up men and then 'leaving them to run down for the rest of their lives.'

Even for the immediate responsibilities that fall to newly qualified teachers, the Council accept as axiomatic that preparation should cover all eventualities which may come their way. For example, the vast majority of children in this country do not come from deprived homes and do not require the help of the social services; yet it is urged that, 'Special emphasis should be placed on the problems of children who are . . . gravely deprived by the circumstances of their homes and districts and on the help that teachers can give to them in collaboration with other social services. Many young teachers feel anxious and inadequate when confronted by parents; they cannot be free from these anxieties unless meetings with parents are planned and subsequently discussed with as much care as practice teaching itself.' If heads and deputy heads are doing their job—as most of them are—young teachers who lack experience and maturity should not normally be confronted with difficult parents. Is there an implication that 'parent practice' as well as teaching practice ought to become a part of initial training?

The distinction between career teachers and women who intend to teach only for a short term of years is an important one. Only five members of the Council, headed by Lady Plowden herself, thought that because of this difference the training of the two categories should be considered separately. In 'A Suggestion on the Supply and Training of Teachers,' the five members propose 'that the three years of teacher training might, for some students, be divided into a basic two year course with a third year of further training to be taken after a few years in the schools.' As they indicate, this amounts to a 'short service commission' which they would limit to five years; they estimate that it would be chosen by two thirds of women students. Their proposal is supported by the powerful argument that it would provide ten thousand more primary teachers during the first half of the seventies. Although claiming that the scheme has educational arguments in its favour, unfortunately the five members do not develop them, stressing mainly the need to increase the supply of teachers. It is a matter of regret that more consideration was not given to the intrinsic merits of the 'suggestion'; it is certainly a proposal that should be fully investigated. Further, the possibilities of sandwich courses and the relevance

of CNAA degrees, both important topics not mentioned in the report, ought to be borne in mind during such an inquiry.

Emphasis is laid upon the value of a long period of practice in infant and junior schools towards the end of the course taken by students preparing for infant/junior and junior/secondary work. This is an emphasis which will be welcomed by primary schools. But heads of infant schools may go on to question the function of the infant/junior course and to regret that the Council, generally so realistic in their approach, did not apparently realise that with the shortage of infant teachers (a scarcity likely to continue during the foreseeable future) there is little purpose in arranging for flexibility of teachers as between infant and junior schools. Heads of infant schools, hard-pressed for staff, are also aware that the weight of practice frequently falls on the junior side and after more experience in that field, infant/junior students are disinclined for work with five and six-year-olds.

Although acknowledging that junior courses attract the less able men, the Council continue to urge, following the National Advisory Council, that more men should be recruited for primary schools. It may be pertinent to remark that if the whole Council had accepted the 'suggestion' of the five members for a deferred third year, there would be no need to alter the balance of the sexes, an alteration which, in any case, makes no contribution to the staffing of infant schools.

Members of the Council formed the opinion that some students were over-protected by their supervisors. One wonders if they are not themselves over-protective in their solicitude for probationary teachers. In a perfect world, doubtless no young teacher would take up a post in a difficult school; regrettably, such schools exist, and it is unrealistic to suggest that inexperienced teachers should never be exposed to unfavourable conditions.

In making the suggestion that LEAs should abandon the common practice of appointment to the service, the Council is again unrealistic. As vacancies are not notified until the summer term, would students acquiesce in waiting for a specific appointment until June?

Is it really probationers who need, as the report suggests, 'non-teaching time in which to visit schools and classes other than their own'? They have had such opportunities throughout their three-year course; if staffing permits, it is experienced teachers who would benefit by seeing what colleagues are doing.

Recruitment and Training of Infant Teachers

Idealists assert that the teacher of 'rising' fives and the professor guiding his post-graduate students are united in one great and glorious enterprise. In the sense that they are contributing to the formation of future generations, they are undoubtedly engaged in the same project. But their tasks (like their salaries) are very different, demanding different qualities. To be successful in their respective roles, the infant teacher requires particular personal qualities, knowledge of children and teaching skills; whereas for the university teacher, profound scholarship is the essential qualification.

What does a parent look for in the teacher to whom she entrusts her child for his first separation from home? Sympathy, humanity, liveliness, appreciation of the arts and ability to adapt the learning to her child's needs—these are the qualities that would come high on the list. To these might be added intelligence (not to be confused with

academic attainment), common-sense and calmness in a crisis—a combination of qualities not uncommon among young women. Yet only 2,500 students were found to enter infant training courses in 1965, a meagre number to satisfy the demands of some 17,000 infant and infant/junior schools.

It is a matter for regret that the Council, despite a constant awareness, frequently mentioned, of the shortage of infant teachers, did not investigate the staffing of infant schools separately. In this they followed the precedent of the Department of Education and Science and of the National Advisory Council. Until the shortage has been quantified, it is difficult to assess the gravity of the position. The report states that the cause (i.e. the dependence on women) is clear, the remedy elusive. Surely one remedy would be for colleges to increase the number of infant training places and to fill them. Of the 26,000 women entrants in 1965, only 2,500, as has just been stated, are preparing exclusively for infant teaching. Compared with the previous year, the number of women joining secondary courses was reduced by 4,000, but they were redeployed as follows:

Junior/Secondary courses	—an additional		2,000;
Junior	"	"	500;
Infant/Junior	"	"	2,000;
Infant	"	"	380.

As the Council were well aware, too many of the infant/junior students will emerge with no more than a nodding acquaintance with infant work; they are likely to be unwilling as well as unable to cope with the demands of a reception class.

There are various reasons why the number of infant teachers in training is so small:

(*a*) In the colleges there is a scarcity of staff with any experience of teaching infants; a point which the report makes about primary school training in general is the lack of relevant classroom experience by the staff.

(*b*) Admission depends too much on academic attainment and too little on personal qualities.

(*c*) Many girls of less academic interest would find the courses more appealing if contact with schools was closer, just as student nurses in hospitals have contact with patients—a contact which brings heavy responsibilities in their final year.

It is significant that, commenting on the evidence they received on their visits to schools, the Council refer to the outstanding work of 'some welfare assistants'; this presumably reflects their personal qualities. For the teacher of infants, 'the message is the medium', the supreme test of success being the kind of person she is.

Any suggestion for a new look at infant training will certainly arouse strong opposition. It will be distorted into an anti-intellectual vindication of the teacher as a 'motherly person'; it will be denounced as a proposal to degrade the image of the infant teachers, one that would reduce them to second-class citizens. To these charges, the rejoinder must be that infant teachers have always inspired at least as much respect from the general public as the teachers of any other age group: that neither motherliness nor the study of 'A' levels and the subsequent study of one subject in depth is a sufficient qualification for work in infant schools. What is certain is that between these two extremes lies an untapped reservoir of potential infant teachers.

Not Just Half—All Our Future

MARTYN CLÉMANS

'At the heart of the educational process lies the child. No advances in policy, no acquisition of new equipment have the desired effect unless they are fundamentally acceptable to him.' This statement (among others) indicated the Plowden committee's support for the child-centred approach to education.

Many schools in Britain might be taken as examples of 'best practice' *à la* Plowden, but *Trends* has chosen the Holymead County Junior School, Bristol. Holymead School is not attractive to look at unless you have a strong Betjemanian penchant for late (in this case, very late) Victorian architecture (*circa* 1900); neither is the Brislington area of Bristol, in which the school is situated, a particularly favoured one.

Most of Brislington, an area on the south-eastern side of the city, consists of small, respectable terraces of about the same period as the school, mixed with some large houses now being divided into flats. There is no selection for secondary education in the Brislington area now, and the home background of the children is fairly varied (mainly skilled manual or skilled clerical, with the occasional professional family thrown in). There are very few really poor families; not many problem familes.

Holymead School has no playing-field space, and the nearest park is half a mile away. The school shares its site with the old Wick Road Secondary School, now annexe to a comprehensive school, and part of its buildings actually belong to the other school, including the headmaster's study, newly-acquired staff room, and gymnasium.

Because of the shortage of play space, a number of games have been devised and others adapted to fit the room available; stoolball is played, a form of shinty, soccer and cricket. Badminton and quoit tennis take place in the school gym, and there is outside space for a netball court. In spite of these limitations the school supplied two representatives to the Bristol under-twelves cricket team last year.

The headmaster, Mr. David Jenkins, holds strong views about the difficulties to be overcome in creating a progressive primary school in seventy-year-old buildings. The school is, he knows, not on Bristol's next ten-year plan for replacement. In some ways this is good for the school, for it means the sound, single-storey buildings are maintained to a high standard. It really is surprising what can be done by the use of carefully chosen colours. Similarly, printed textiles, large paintings, collage pictures and patterns by the children brighten, modernise, and help to reduce excessive height when used as wall hangings. At the same time the air of permanence and continuity which the old buildings give, is maintained.

Possibly the best test of the interest a class of children has in its work is to withdraw the teacher without warning, leaving them unattended. The length of time taken for the room to dissolve into chaos is an indication of the absorption of the children in what they are doing. From some classes at Holymead, one got the impression that if for some reason a teacher was called away and did not return, their classes

would simply pack up their books regretfully at a quarter to four, put away the primary school paraphernalia in its appropriate place, and quietly go home. Certainly during the periods when I was talking to teachers about their work, the children could not have been more closely engaged.

It is this engagement, in progressive schools, which forcibly strikes the visitor. The children move about the classrooms and the school generally in a free and informal way. They approach the teachers spontaneously, and without ceremony. They seldom put up their hands to ask questions. The children are used to working in groups of various sizes and sometimes on their own, and deep concentration and effort goes into their work, but they are also relaxed.

Flow of Ideas

How is this kind of atmosphere developed in a school, and how is all the seemingly random activity orientated into meaningful education? In a school like Holymead it is not easy to control the work by a written scheme or syllabus. Give and take between teachers, both old hands and new, contributes to a flow of ideas and activities. The more competent and versatile the teaching team becomes, the more pressing the need for strong guidance from the head, if the school's many objectives are to be achieved.

'We try to create' said Mr Jenkins, 'an environment in which the children are respected as people. Obviously the first task here was to adapt the old premises of the school to a re-defined purpose, and method; it was built in the days when you sat children, even very young ones, down in rows and quietly pumped facts into them—or at least tried to! The basis of our approach, the so-called progressive or child-centred approach, is for the childen to do the finding out. By exploiting every possible source, and resource, we have obtained a fairly plentiful supply of materials and equipment here for exploring and experimenting, much of it mobile so that work can be done with groups of different sizes; at the centre of this is the hall/workshop in which classes can be combined.'

French and Nuffield science at Holymead probably illustrate better than anything else just how far some of our best primary schools have advanced. But Mr Jenkins emphasised that they used a 'Nuffield approach' long before the Nuffield projects began, and in fact, French has been taught in the school since 1953.

Because of the multiplicity of equipment that is used in science, and the array of projectors, tape-recorders, shops, toys, pictures and models for language instruction—all there to help improve verbal facility—there is a constant need for consultation between the head and the teachers concerned with the work.

The basis for discussion and planning at Holymead are the work analysis sheets prepared by the teachers. Immediately after the start of each new term, teachers compile summaries of new themes being developed in their classes, in mathematics, science, general studies, art and craft and dramatic and oral expression. They try to locate and indicate any known correlation between these new themes and the children's own interests.

Flow diagrams are constructed of the ways in which they, the teachers, think the work might be developed. These they discuss with the head,

who suggests ways in which the theme might be extended, if he thinks this necessary, and sensible links that could be developed with other topics and subject areas. Hence the process of developing teaching ideas is a two-way one; it is also the main means by which Mr Jenkins keeps in touch with the work of his staff.

It is essential for a teacher to know clearly the implications of taking a particular line, and the facilities and apparatus and books the school can call on to develop a particular theme. Thus planning helps the class teacher to put his own ideas into logical order and establishes that, as far as possible, all aspects of the children's development is being catered for. But in no sense is a set work scheme produced, only guidelines along which the term's work *might* proceed. If the class work develops in other ways, well and good; often very good—provided it is not allowed to become unrelated to the original theme. In this way inspiration in the classroom can be harnessed into a meaningful framework.

The analysis sheets also allow the work of the whole session to be carefully planned and integrated, and give Mr Jenkins a chance to see very clearly what is going on at any one time, and the stage of development a particular group of children has reached. He himself plays an indirect part in assisting all the class projects that are taking place in the school and, because he is likely to be called on to take any class at a moment's notice, this knowledge is essential if the continuing development of the children is to be fostered.

The integrated approach to teaching at Holymead involves different groupings of children. These groupings often develop quite naturally for a particular piece of work. The absence of rigid class patterns, and the use of 'team' methods on the part of staff, sets its own problems in communication and recording.

The work of a head teacher in schools like Holymead often seems quite casual, and it is this very casualness that helps liaison between himself and the class teachers. In the case of a young and inexperienced teacher this can be absolutely vital to his integration into the life of the school.

'We try' said Mr Jenkins, 'to make each teacher feel that the source of inspiration comes from within himself. If this is missing from the work it will become flat and sterile. The head teacher in a school like this must provide the atmosphere where each and every teacher feels adequate to the task of developing a good class/teacher relationship. This is the core to the success of serious education and I hope we are at least somewhere near to achieving it.'

The school now has five teachers on the staff able to teach French. This must be something of a record for a small primary school. The method used at Holymead has been evolved over a number of years; and uses part of a number of film strips but basically *Bonjour Line*.

Limiting Factor

In primary science at Holymead, as in every other primary school of this kind, the limiting factor to the creative work done can be the teacher's own knowledge: and it is surprising how quickly you find out how much you don't know from the children's probing questions!

E. G. Hall[1] summed up the process of what should be taking place very

[1]E. G. Hall, 'The Physical Sciences in the Primary School', *Bulletin*, Collegiate Faculty of Education, University College of Wales, Aberystwyth.

well: 'In elementary science lessons the teacher is a sort of catalyst, he promotes and regulates the interaction between eager and curious children on the one hand and the objects of their curiosity on the other. The nature of this interaction is a *finding out activity* which broadens children's experiences and forms a wide range of new concepts. For this purpose it is by no means essential for the teacher to know the answer to the child's question. Where the teacher does know the answer there is a great temptation either to tell the child and so, in effect, prevent him from finding out for himself ('spoiling the fun' as one child put it) or to guide the investigation along traditional lines and so stifle spontaneity.

Holymead School is especially lucky in having on its staff a teacher who owns a small-holding in the vicinity of the city. With a colleague he has arranged a series of one-day visits to this farm which has resulted in a great deal of interesting work by the children. The farmhouse was drawn, measured and photographed from a variety of angles and its history traced and recorded. A well on the site provided scope for some interesting work on volume: the farm itself for creative investigations of concepts of area and distance. One boy surveyed the whole farm (using the method of off-setting) and mapped it. A contour model was produced in cardboard, and the streams were investigated, their depths and widths at different points plotted on graphs and profiles drawn. The number of buttercups in a particular field were estimated and graphed.

The work of the children on these and many other investigations were presented in the form of a well-arranged exhibition by the school, to which parents were invited. Attendance was high.

The attendance has been high on most occasions when the headmaster has attempted to show parents what he and his staff are doing. Recently the school held an evening teach-in for parents, to show how French lessons were carried out. Four teachers gave demonstration classes with the first, third and fourth year children.

This, and other similar PTA activities, take up a good deal of the staff's evening time, but it is repaid in the co-operation the school gets from parents, and the interest which they take in what is going on. Over the past five years the PTA has raised more than £3,000 for the school, which has been used for visual aid equipment and in providing staging for the school hall. This in turn extended the range of school drama, if only in increasing the motivation that the possibility of having an invited audience gives. Both internal and external information dissemination is aided by the PTA-purchased photoduplicator. The deputy-head said, 'It is absolutely invaluable in producing additional copies of our own assessment cards.'

Holymead is a school where it is difficult to get most of the children to go home in the evening. A chess club is active—there were about a dozen pairs of ten-year-olds (all boys) battling diligently the evening I was there. Badminton is played in the hall most evenings, and the school has its own dark-room for the photographic club, in a large ex-cupboard between two adjacent classrooms. The standard of some of the work produced is surprisingly professional. Music is strongly encouraged and Mr Jenkins is very proud of the school choir and recorder orchestra. Pottery is the next activity on the horizon, and a room has now been equipped for this purpose. If the standard of the

other handicraft work is any guide, the results should be worth seeing. The school is shortly to have its own swimming bath—in a converted classroom!

But the basic question one ought to be asking is, what does the progressive approach to primary education achieve that the more rigid and often more authoritarian methods of the past (and in some places and cases, the present) do achieve? Educational research ought to be able to help us in the process of evaluation. Most researchers, whilst presenting useful data in the 'achievement' area, are usually forced to fall back on wishing that more exact tools for personality assessment were available.

Dr K. Lovell[1] concluded from a study he made of reading, that standards *had not deteriorated* in progressive schools compared to more formal schools and thought that such schools 'might well have benefited their pupils in other ways.' The *Research Bulletin* of the National Education Association (Vol. 35, No. 4) pointed out the difficulty nowadays of deciding what 'progressive' means.

'Several schools using progressive programmes were paired with conventional schools. McCall and his co-workers concluded that pupils in progressive schools learned academic material more readily and gained in personality development to a marked degree. The main difficulty in all such studies was to make a neat and sharp differentiation between whole schools as progressive and non-progressive since teachers themselves differed so markedly in their approach to their pupils.'

Dorothy Gardner[2] concluded from a long-term study she made of seventeen pairs of schools one 'conventional', one 'progressive', that qualities of initiative, independence and self-confidence are improved by the informal approach to education, that social skills are enhanced, and that emotional well-being of the child is better safeguarded. All these were impressions little capable of measurement. The results she found in attainment tests were somewhat contradictory. Nine of her experimental schools as compared with two control schools were ahead in reading, and six pairs of schools showed no difference. In arithmetic the position was very varied and in many cases control schools had done better than the experimental ones.

John Burrows, H.M. Chief Inspector responsible for primary education, has written (*Trends* 9). 'Full of interest for the children as methods involving their personal activity and discovery are, it is only right to recognise the dangers. A poorly-guided project may be superficial and diffuse, encouraging a butterfly attitude in the pupils who are leaping from one aspect to another and not dwelling in any depth upon any one. Roaming over a wide area of subject matter will not in itself ensure that children relate one part to another. Shrewd evaluation and skilful guidance by the teacher, coupled with adequate resources, are of course the safeguard; but they demand both personal resourcefulness and experience in large measure. Again, children's own interests are erratic, and to follow them as a guide to the next topic or allocation of work can, unless the teacher be both thoughtful and

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[1] *Educational Research* Vol. 6, No. 1.
[2] *Experiment and Tradition in Primary Schools* by D. E. M. Gardner (London, 1966).

wary, lead to an education which, though stimulating, is out of balance.'

This is a salutary warning to the unwary. There is evidence that Mr Jenkins and his staff are aware of the pitfalls, and of the need to develop basic skills, in what used to be called the three Rs: that they take care to encourage good writing—both the mechanics and the creativity; that general reading standards are good and backward readers not neglected; that basic mathematics understanding is not overlooked.

I got the feeling that if Holymead was in the middle of the Sahara Desert, the teachers could assess where the children's interests lay and devise project work of interest. They'd have the children out measuring the speed of shift of sand dunes, calculating the number of silica grains to the square mile, and drawing block graphs of the incidence of the desert rats: the Jirds, Gerbils and Jerboas. 'And now, children, how shall we go about measuring the rainfall here at Timbuktu ?'

In February the Dainton report recommended that steps should be taken to ensure that within the next five years the majority of pupils in secondary education should come into early contact with up-to-date, relevant, and attractive teaching of science.

Introducing Nuffield Chemistry

A. JACKSON

The current jargon of the science master now includes such phrases as, 'We are (or are not) "going Nuffield" next term.' Not a very elegant phrase, perhaps, but we all know what is meant. Just what is involved in this 'going Nuffield'? The following is an account of one person's experiences in introducing the Nuffield Chemistry Project in a three-form entry grammar school—and an appraisal of the problems encountered in doing so.

When the venture started, the school was housed in a 50-year-old building, with one small, cramped chemistry laboratory and a large cupboard, dignified by the name 'Prep. Room.' The first and second forms were taught general science for four periods per week; the third forms had three separate sciences, each for two periods per week; and the fourth and fifth year sets for chemistry had four periods per week, one or more of these being taught in a classroom. Classes normally consisted of 36 pupils up to and including the third year, and 30 pupils in the fourth and fifth years. Sixth form sets had seven periods per week, not all in the laboratory, and varied in size from 10–15 pupils. It was probably fortunate that the existing chemistry course was taught with a very practical bias, and that heuristic methods were adopted whenever this was possible. This meant that the pupils already observed a good laboratory discipline. This does not imply that they sat in serried rows, and that strict silence was imposed. Far from it!—they moved about freely (or as freely as the congested conditions would permit) and spoke to their neighbours as occasion required. But both the movement and the conversation were purposeful. A flask was required, so someone went to the appropriate cupboard to get it. A problem arose, so the members of a group discussed their method of tackling it. The teacher circulated from group to group, encouraging hypothesis, praising good experimental technique, and controlling subsequent discussion. But demonstration lessons, too, played an important part, and so too, especially as examinations approached, did 'chalk and talk.'

It was intended to introduce stage I of the sample chemistry scheme to the first year classes and stage II to the third year. But as the first forms were being taught an existing general science syllabus, modifications were required at once. As an interim measure the chemistry content was deleted from the syllabus, and for the first term this truncated general science was taught. In the second and third terms

two periods per week were devoted to chemistry, the remaining two periods being used to continue the remainder of the syllabus.

This was not really satisfactory, and the following year, with the headmaster's approval and active co-operation, the school reverted to an earlier scheme—two periods per week for each of the separate sciences for the first, second, and third years. This facilitated the introduction in later years of the Nuffield physics and biology schemes. The 'combined science' scheme was not then available, of course, but probably this or some similar integrated scheme would have been preferable on educational grounds.

In this first year of the trials the third forms and one fourth year set were introduced to stage II of the Nuffield scheme without any special preparation, but experience showed that a short introductory course was really advisable. In subsequent years the problem recurred because the school accepted a class of 25 children transferred from secondary modern schools at the age of 13+. These children had the most varied background, some having practically no science, some being nearly as advanced as their contemporaries in the grammar school. A short ten-week course was therefore devised, based on stage I, which introduced the techniques of chemistry involved in purification; the action of heat on selected substances; the action of the electric current on selected substances; and a simple problem on the investigation of an ore. With this background we found that these pupils could tackle stage II with some confidence.

In this second year of the trials all of the first four years were committed to Nuffield methods, and so was one fifth form set, and from then on the chemistry course was entirely 'Nuffield.' The school has been given the opportunity of participating in the advanced level trials, so that this year (1967) every class, from first year to upper sixth, is engaged in Nuffield work.

Effect on Staff

What has this meant to the staff? At first it was difficult to adjust to the new conditions. The idea that the class were to pursue an investigation was not new. Nor was the necessity for preliminary discussion. But the acceptance of class decisions at this stage was strange. It was not easy in the initial stages to get the class to discuss a problem freely, but once familiar with the idea some very sensible discussions followed. The teacher had to refrain from leading the children to the desired end. No apparatus could be displayed which would give a clue to the experiment expected. Here was a problem designed to whet their curiosity. From this curiosity a whole series of hypotheses could be expected, some sensible, some not so sensible. But hypothesis alone is not enough. These flights of fancy must be checked by experiment—and the experiment must be so chosen that it does unequivocally confirm or refute the theory. Such is the inertia of the human mind, however, that we found after a year or two that the children with their limited knowledge of chemical techniques could suggest only a few experiments—and these usually included those in the Nuffield scheme. But other experiments were suggested, and were not to be lightly cast aside. They were, after all, quite serious suggestions, whether or not the teacher knew that they were foredoomed to failure. So when the class separated into small teams in order to check their hypotheses, some teams at least must try these experiments.

But how could one prepare for this sort of lesson, especially with limited laboratory assistance? The first thing was to prepare the sets of apparatus required for the sample scheme experiments, and store them in cardboard trays. Then two laboratory trolleys were made. One of these could be stacked before the lesson with the appropriate trays, and then some inspired thinking by the teacher could usually ensure that the demands of some of the more obvious alternative suggestions could be met. At the right stage of the lesson the trolley could be wheeled into the laboratory for the children to select the apparatus required for their particular experiment. But inevitably the time would come when the teacher had not foreseen all of the suggestions made by the class. Simple apparatus, test-tubes, beakers, etc. were stored in the laboratory so that if this was all that was involved the team concerned could rapidly collect their own apparatus. Sometimes it was readily available in the prep. room. Occasionally there was just not time to prepare it during the lesson, and a team would have to content themselves with one of the other experiments, and a promise that they could pursue their own line of investigation during the next lesson (or even during the midday break if they were sufficiently enthusiastic).

Meanwhile the second trolley was being prepared for the next class by the laboratory assistant, working from the printed list in the sample scheme, and a list prepared by the teacher. In the first year or two of the trials a great deal of work was thrown on both the teacher and the laboratory assistant in making up the sets of apparatus required. But at least one was heartened by the thought that when a set was completed and stored in trays or boxes one would not have that job to do again. Of course there was another problem, that of storage—and this was not solved until the school moved into a new building. This was on much more spacious lines. There were two chemistry laboratories, sharing a common and fairly large preparation room. Adjacent to the laboratories were a small balance room and a store room. The store room was rather small, but it did reduce the pressure on the preparation room. Both the preparation room and the laboratories were equipped with as many cupboards and shelves as could be obtained within the prescribed cost limits.

As the end of the lesson approached the children had to be trained to clean their apparatus and return it to the appropriate cupboard or tray. Sometimes, of course, proper cleaning was impossible, and such apparatus was put in a special box to be dealt with by the laboratory assistant. Time had then to be found for a final discussion. Did the experiment confirm the hypothesis? What was the general class opinion now? Where numerical results were obtained, what reliance could be placed on them? The idea of experimental error was introduced at a very early stage, and each team had to record its result on the blackboard, often in a simple graphical manner.

At first classes brought up on traditional chemistry would persist in asking, 'What is the right answer?' but this gradually ceased, and great interest was displayed in the class results. It was noticed that without prompting there was now a tendency for a pupil to state that 'the probable answer is . . .', or 'probably the formula is . . .' Experimental results which deviated grossly from the mean were the subject of merciless inquisition by the rest of the class. 'Did you let it boil over?' 'Did you spill some?' But a fairly close scatter about a mean value was readily accepted.

Correctly handled this latter part of the lesson would usually inspire further questioning by the class, leading to the recognition that yet another problem was facing them. This would have to be dealt with in the next lesson. But things did not always work out like this. A single period could be either 35 or 40 minutes, so that the usual laboratory session was 70–80 minutes. The sample scheme assumed a double period to be 80–90 minutes, and this meant that there were many occasions when discussion time was very limited indeed, and much of the thinking had to be done at home, or postponed to the next lesson. But after a year or two familiarity with the scheme brought two rewards. Each separate lesson proceeded more smoothly because the teacher was more familiar with the subject matter and method, and the whole of stage I was completed in five terms instead of six, thus enabling us to start stage II a term earlier.

It proved possible after this to introduce first of all the Nuffield physics scheme, and later the Nuffield biology scheme. Fortunately, by this time the school had the services of a qualified technician and a trainee technician, who in the new building had to look after six laboratories. They were obviously kept very busy, and the use of trolleys spread to other departments. The printed lists of apparatus in the Nuffield book were invaluable, and much time was saved by merely specifying the number of the topic in the Nuffield scheme, and adding to this a list of any extra apparatus which might be required. Of the special apparatus recommended for the Nuffield chemistry scheme much has been written. The precision gas syringes are so convenient and accurate that experimental work on gas volumes became a pleasure. The daylight 8 mm film loop projector was permanently on the front bench, and illustrative film loops could be used at any time without laborious preparation, and without blackout. But the biggest time-saver was the single pan top-loading balance. Accurate and reproducible weighing was now a simple matter, each weighing taking less than fifteen seconds. At first only one of these balances was available, but it served class of 36 and enabled experiments to be completed in a double period which otherwise would have taken two double periods. Even more important, with the accuracy now available the whole class could obtain meaningful results.

List of Experiments

One temptation had to be avoided. The sample scheme is so well-written that there was a strong tendency to work through the list of experiments one after another as if these were set exercises which had to be mastered. The staff had to remember that each topic was a problem to be investigated experimentally, and that the class discussion was the real guide to the experiments which would be performed. Naturally, during this discussion the methods suggested in the sample scheme could be brought forward by pupils or teacher as *one* way of reaching a solution, but other ways could be proposed and should be tried.

In order that this sort of practical work could proceed safely it was essential that from the first form onwards the children should know exactly where to find common apparatus, should have perfect control of the Bunsen burner, should be able to connect up a 'lab-pack' correctly, should make notes during the performance of an experiment, and should be prepared to stop and to listen in silence whenever

the teacher began to speak. Once these habits had been established, experimental work could proceed with a minimum of teacher interference.

No text books were provided, but the old 'O' level text-books were available as reference books. The Nuffield 'background readers' were used both to extend the pupils' knowledge and to stimulate enquiry. No notes were given to the children, but during class discussion the salient points which had been discovered were emphasised, and it was indicated that any account ought to include these facts. Each child kept a journal which was a very personal account of the work done. For some children this was a brief (sometimes very brief) account of an experiment and little more. For others it was an opportunity for creative writing illustrated by actual specimens in little plastic envelopes, and enriched and expanded by magazine illustrations and newspaper cuttings. In order to encourage this sort of treatment, loose-leaf binders were issued, so that later discoveries could be inserted at the appropriate place. Most of the boys and some of the girls seemed to like this way of learning chemistry, but some girls regretted the lack of a text-book which could be 'learnt by heart' for examination purposes. This attitude tended to persist in some cases even after they had experienced the type of test set during the Nuffield trials—a test which encouraged reasoning, and which required little in the way of pure factual recall and regurgitation of notes.

Reference books and books of physical and chemical data had to be readily available, and the use of the library as an additional source of information had to be encouraged. Non-specialist teachers, taking some of the lower forms, would find discussions developing in unexpected ways, and they, too, made good use of the departmental library.

The results of the change to 'Nuffield' methods are difficult to assess. The staff found it stimulating and challenging, but also found that it involved a great deal of hard work. The children found the lessons exciting and interesting. Examination results seem to be little changed, and it is too early to say whether larger numbers of children will be encouraged to study science in the sixth form. But undoubtedly these children will have a greater awareness of what science is, and of its impact on our daily life. In the modifications which must be made if the Nuffield scheme is not to fossilise, it is the needs of the large proportion of children who are not going to be chemists which must be kept in mind. It will be ten years before the full effect of the Nuffield projects can be estimated—and I wonder what the scheme will look like then.

An engineering science syllabus for sixth forms was recently introduced by the Northern Universities Board. Some of the implications of introducing technology into schools are discussed below.

Technology in the Sixth Form?

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Education has, as two of its main functions, the discovery and development of the talent of the individual and the response to social need. The importance of the successful fulfilment of these functions has never been as great as it is today in an age in which society has, for the first time, the means to satisfy human need and in which the possibilities of a full and peaceful development of these means depends so greatly on human education. In an age, furthermore, which is characterised by a deep inter-dependence of communities and social groups and a rapidity of social change, the consequences of success and failure in this task are immeasurable.

The extensive growth of world education in recent years reflects the social pressures and conscious awareness of this present educational task. In this country this awareness is reflected in the present intense discussions on the provision of an educational system capable of developing the talents of the broadest spectrum of our population. In terms of the specific development of higher education the task is conceived as the need to generate in all pupils the attributes of common citizenship and an understanding of both the humanities and the sciences. It is from such sources that the presently developing concepts of the new sixth form school curricula spring.

It is trite but necessary to note at this point the genesis of these societal and educational changes. They arise clearly from the technological forces which dominate the world of today. In view of the existence of this technological fabric of our society it is surprising to find the educational forum taken up almost entirely with the massive dialogue between the humanities and the pure sciences and between these 'special' studies and the relatively undefined area of 'general' studies or 'general' education. The time has now surely come when greater attention must be paid to the place of technology within an educational system which clearly has social responsibilities to discharge. Although this educational system serves a technological society, the proper role of technology within the system is too little discussed and too little understood.

Now that future patterns of education, particularly those affecting secondary schools, are being formed, questions about technology in education should be answered. For instance, should the element of technology be all pervasive or restricted to specialist studies? Are there certain aspects of technology which should be incorporated into the education of all pupils? At what point in educational development

should technology cease to be part of general education and assume a vocational purpose?

Some understanding of the nature of the problems may be achieved by a study of the special relationship between science and technology and the scientist and technologist. It is clear, for example, that much of the intellectual armoury of the scientist and technologist is the same but that they are motivated in significantly different fashions. The scientist is concerned with developing an understanding of nature as it exists, whereas the technologist is concerned with the application of science to the satisfaction of human need. From this basic difference in motivation arise substantial and important differences in the attributes and methodology of the scientist and technologist. On the one hand the scientist is concerned with the analysis, isolation and rigorous investigation of individual phenomena as a basis for the development of an understanding of the inter-relation and laws governing such phenomena. It is in the process of deducing the existence of natural law that the scientist displays his natural intuitiveness and creativity. The technologist, on the other hand, accepts the known data and discovered laws of pure science and mathematics as part of his fundamental currency. It is, however, an inevitable feature of a technological problem that these laws and data are insufficient for a solution to be achieved. The solution to a real problem can be achieved by the technologist only by supplementing his science with the gathered 'know how' of unexplained human experience, and with the understanding that the solution, therefore, will always be partially unknown. It is this combination of science and art which defines technology, and it is in effecting this combination that the creativity of technology lies. It is indeed this aspect of creative inventiveness which characterises and is so often magnificently displayed by the technologist. But the requirements for a successful technologist are not solely inventive ability and an understanding of pure science. His work is characterised by the need for synthesis and design, the ability to conceive the wholeness of a product and an understanding of the limitations and stimulus to his conception imposed by material, human and social resources.

If these brief statements are true then we have distinguished some of the desirable attributes of the technologist; an understanding of, and ability to apply pure science and mathematics, an ability to synthesise and conceive spatially, an awareness of factual, human and material limitations to success in endeavour and a creative art. As separate parts these qualities are, of course, not unique to the technologist but in their summation they are.

It is pertinent to query now whether an awareness and conscious development of these attributes is sufficiently a part of the present or possible future educational system in schools. There is considerable evidence that this is not so, and that the consequences of this relative neglect are emerging as national industrial and economic underdevelopment. Although there are many who appreciate the existence and importance of this problem there is, as yet, no general affirmation of the material and cultural benefits which would accrue to the nation and the individual by the proper development of school technological education. Such a general agreement must be quickly achieved so that the challenging task of devising suitable forms for this education may be initiated.

Assuming the desirability of school technological education, this

article is concerned primarily with the arguments for engaging in this education at sixth-form level and with the particular forms such an education may take. Such a discussion is apposite to this time of transience in sixth-form educational patterns.

Ideally, of course, sixth-form technology, should be a continuation of a technological education in the middle and lower schools, in which the classroom is not divorced from the real external world, in which manipulation and abstraction complement each other in the learning process and in which the beginnings of an understanding of the synthesis, design and creative properties of technology are laid.

It is the continued development of an understanding of these technological attributes and their significance in relation to society which should be an essential part of all sixth-form education. In such a sixth form the qualities of the humanist, scientist and technologist will be equally prized and nurtured. In such a 'new' sixth form, many varied detailed forms of technological education will be required, the devising of which should be a part of the general problem of the development of new sixth-form curricula.

Arts Pupils

Although relatively little attention has been paid so far to the technological education of the 'arts' pupil, possible forms for the 'science' based pupils have been the subject of much discussion in recent years. Such a discussion has been necessary, because it is these pupils that become the professional technologists, and because there is evidence of a clear disinclination amongst them, particularly those with high academic ability, to enter the stream of higher professional technological education. This represents a serious problem for society within the wider problem of the pesent general 'drift' away from the sciences. As an aside it might be noted that through-school technological education could contribute strongly towards reversing this 'drift.' But whatever are the attempts to solve this general difficulty, there will remain the problem of securing an adequate flow of able boys and girls into technological occupation. In the view of many concerned, it is the isolation of science-based teaching from the real world and its preoccupation with rigour and analyses, and concomitantly the lack of an appreciation and development of the positive attributes of technology, which have mainly generated this problem. From this viewpoint the actions required are clear and for the sixth-form specific developments have emerged which can be distinguished as three main modes of technological education:

(1) The introduction into pure science curricula of course work designed to develop technological attributes.

(2) The development of new syllabuses, science-based, specifically designed in subject matter and course work to develop the interests and qualities of modern technology, and which, for example, as engineering science, provide an alternative study to sixth-form physics or physical science.

(3) The introduction of new syllabuses devised for the development of specific technological attributes, such as engineering design, and which are studied in conjunction with syllabuses in science or engineering science.

All three forms of study are viable in the present sixth forms. They

should remain so in any future sixth-form pattern which takes into account the value of technology and which rejects curriculum rigidity. Some comment is worthwhile, therefore, on the present state of these forms of study and on some of the implications involved in their development.

The first type of study noted above, namely the introduction of new forms of course work into the established science curricula, has been pioneered by a number of schools and is in the process of establishment on an examining basis. The major effort has been concerned with devising open-ended investigations and project work suitable for sixth forms and which develop the educational objectives of analysis, synthesis and research. At the same time, experiments and laboratories have been developed to present to the science pupil a range of practical and engineering devices which exemplify scientific principle. These developments of open-ended investigations, projects and practical device experiments are now receiving the detailed attention and support of the Schools Council's project teams on applied science and technology. This particular path to technological education is attractive, not only because it will clearly improve the teaching and learning of science, but also because it represents a method which can be relatively easily absorbed into present and future educational patterns. It would be well, however, to recognise the limitations of this particular approach. The effort here is to introduce an additional element of learning and activity into curricula which are already too extensive. Yet whatever the nature of sixth-form curriculum patterns which develop from present discussions and whatever the place of specialist study in such patterns, it is essential that the demands of each special study, particularly in the sciences, subject by subject, should be reduced, and that there should be no place for subject studies at the present advanced level of intensity. If this view is correct, one must fear that a reduction in specialisation may affect the proper development of the technological component of a science curriculum. It is probable that project and investigational work will become established in science studies, but perhaps rather for the contribution that can be made to the development of scientific attributes than to the needs of technology. Such fears are accentuated if the aim of achieving a broader education is attained by, for example, the reduction in the number of specialist subjects to be studied by a pupil and by the replacement of single subjects by combined syllabuses. The problem for science, technology, medicine and all vocational disciplines is, in this respect, simply how to ensure adequate training for professional qualification within the total period allotted to formal education. The move to reduce specialist studies in school without the compensatory extension of total school and university education will lead to the most difficult decisions on the nature of the subject matter to be retained in the sixth-form syllabuses and to possible serious consequences for professional competence.

In the light of these considerations and recognising the value of some study in depth it is likely that whilst the pupils' total amount of specialist study will be reduced, it will be necessary to offer a choice of a wide range of subjects for special study, possibly even wider than at present. Thus the case for a combined subject such as physical science is clear, but in the logic of the changes occurring, the need for the continuing opportunity for a study of physics and chemistry separately is

also apparent. Indeed, only benefit can result from the co-existence of these studies in a school with adequate facilities. Thus, in this view, the circumstances of the situation weigh against modification of the subject content of the pure science curricula towards technological education, but favour an additional syllabus, science-based, with content and course work specifically designed for the development of technological education. Such a syllabus will react favourably with the physics syllabus and afford a stimulus and opportunity for many pupils. The development of new science-based technological syllabuses is the second of the three modes of technological education noted above. An engineering science syllabus of this nature has been offered recently by the Northern Universities Joint Matriculation Board and the concepts and format developed for the syllabus serve well to illustrate the nature of this mode. Three primary conditions determine the nature of the syllabus.

(1) The syllabus should present a selection of physical principles and data appropriate to modern engineering science, developed in classroom and laboratory for the cultivation of technological attributes.

(2) The syllabus should be comparable academically with the pure science syllabuses.

(3) The syllabus should be acceptable for admission purposes by university engineering departments and if taken in lieu of physics broadly acceptable also by university physics departments.

The acceptance by university departments is clearly important. It will be known that engineering departments have often indicated a preference for sixth-form science study rather than for sixth-form engineering. But it should be noted that it is the proper rejection of a sixth-form study of narrow specialist engineering topics which has been declared. An engineering science syllabus, clearly science-based, academically comparable to physics, presenting no soft option but a challenge to pupils, will receive considerable support in university engineering departments. Indeed, the wide acceptance by these departments of the Joint Matriculation Board syllabus is evidence of this claim. Since a science-based engineering syllabus will normally exclude the simultaneous study of physics, care must be taken to ensure the minimum restriction to choice of university course by pupils taking the syllabus. In practice, this means that those pupils would be considered for admission by physics departments. In the present growing relaxation of rigidity of demand this aim should be achieved and the Joint Matriculation Board syllabus is proving this to be the case.

Some detail of the Joint Matriculation Board syllabus content and the interpretive development is worth noting. An attempt has been made to collect the subject matter into sections relevant to aspects of modern engineering science and to collate the physical principles so as to display the similarities which exist in different fields of physical study. The section titles are worth recording. They are, mechanics, materials science, physical transport phenomena, wave phenomena, field phenomena, basic systems analysis, electron physics and devices, thermodynamics and energy conversion. Clearly, the syllabus cannot be criticised as narrow engineering specialism. Indeed, studied in conjunction with mathematics the normal combination, it should provide a mental challenge for even the most able in the sixth-form. The interpretation of the syllabus phrasing is of significance. In accordance with

the basic purpose of the syllabus it is the intention to develop an understanding of the physical principles by constant reference to practical application and to introduce the concepts of design, and limitations of factual, material and human resources to these applications. This interpretive task is not easy, and possibly new to most schools. For this reason those concerned with the syllabus are engaged in the production of bibliographic and full text guidance for teacher and pupil.

A further important facet of the syllabus relates to the course work requirement. In keeping with the nature of the study, a pass in the subject as a whole can only be attained if the pupil achieves a satisfactory standard in his course work. This special requirement relates to the course work undertaken in school, for there are no practical examinations. The syllabus specifies that pupils will be required to submit laboratory reports on four experiments chosen from separate sections of the syllabus and on a project investigation undertaken during the course of study. The reports will be assessed internally and subject to moderation by the examiners. The assessment will contribute to the final result of the examination as a whole. Those concerned with the syllabus are engaged in preparing detailed guidance material for teachers on suitable course work and equipment. The guidance notes contain a classification of work into controlled assignments, experimental investigations and project work and describe the objectives of each class of work. It is suggested that approximately 40 per cent of the course work time available should be spent on the project, and lists of projects and case histories are provided. It is in the clear definition and attainment of the objectives of the course work in relation to the subject matter of the syllabus that a major contribution to the prime purpose of the syllabus will be achieved.

The third form of technological education envisages the introduction of new syllabuses designed for the development of specific technological attributes. Such a syllabus on engineering design has been formulated, for example, by the Leicestershire Education Authority. Syllabuses of this nature are not intended to replace the study of physics or engineering science but are arranged to be complementary to such studies. In the developing sixth-form patterns with emphasis on reduction in the amount of specialisation in one field of study, it may be that engineering design could never be a major study for any pupil. On the other hand, the subject could be a most useful and suitable form of complementary subsidiary study. Those schools with a special interest in developing technological education might well elect to provide a course in engineering design and this would fit the probable developments in sixth-form patterns. Other supporting syllabuses have been devised by the Oxford Local Examination Delegacy and by the Associated Examining Board. If the benefits of curricular flexibility are valued then the provision of some of these additional special syllabuses will be supported.

Conclusion

The problem of developing awareness and agreement on the place of technology in the sixth form is difficult, particularly at a time when attention is so centred on the painful re-adjustments of the traditional components of sixth-form curricula. Nevertheless, the need for technology is urgent and it is important that the problem should be

fully discussed. The preceding considerations are intended to provide a contribution to this discussion.

The forms of technological education which have been described are, of course, not the only viable forms but it is suggested that these particular modes are worthy of serious consideration for further development. It is recognised by all concerned that these developments will provide, by experience, a source for continual change and improvement. Efforts directed along these paths, in developing the special attributes of the technologist, will be aiding an educationally worthy and nationally desirable aim.

The fifth article in our series on the work of the colleges of education examines the place of 'education' in the training of teachers.

The Study of Education

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What is now the study of education in colleges of education had its beginnings a century or so ago in the study of school management, which covered everything from the accurate completion of registers to advice on the moral conduct of the teacher. F. W. Harding's *Practical Handbook of School Management and Teaching*, published in 1878, was typical of the text-books that students of the time were required to study.

> 'A master should . . . conduct himself in his private affairs in a manner becoming his calling. He should choose really respectable people for his friends, and should be careful to keep himself from the beerhouse. Parents will not willingly send their children to be taught by a man who degrades himself by forming low associates or habits.'

But mixed in with advice of this kind, and with the details of methods of instruction appropriate to the relevant code ('As each continent is brought before the children, our colonies should be pointed out, and described with some degree of minuteness.'), there was also the glimmerings of a concern with the development of the individual child that, in its developed form of educational psychology, was to be such a prominent feature of the study of education for the next sixty years.

> 'The schoolmaster may be likened to a sculptor. Each has the material upon which he has to exercise his skill placed before him in a rude natural state. As the sculptor with the various kinds of stone, so the schoolmaster with his pupils should treat each according to their respective qualities. No skilful workman would reduce his block of stone to the required shape until he was quite sure that he understood its peculiar nature and property and had so placed it that each blow of the mallet might not send it rolling from him.'

By the 'twenties of this century educational psychology was well established in the colleges as a field of study and concern. The doctrines of progressive education owed a good deal to studies of the development of the young child, whilst on the cognitive side the stress upon individual differences coincided with the need to devise reliable and valid means of selecting children for different kinds of post primary education. The progress of the mental testing movement can be observed in the references to the use of psychological tests in the official reports on education of the period. The Hadow committee of 1926 found that such tests were already in use in some areas, noted that there was (already!) a tendency for candidates to be prepared beforehand for them, and felt only able to recommend that they might be used 'in dealing with border-line cases or where (there was) a discrepancy between the result of the written examination and the teacher's estimate.'

The Committee on the Primary School of 1931 went further—'in our opinion carefully devised group intelligence tests may be a useful factor in selection, but it would be inadvisable to rely on such tests alone.' By 1938 the Spens committee was receiving evidence from psychologists to the effect that general intelligence, defined as 'innate, all-round actual ability . . . enters into everything which the child attempts to think, or say, or do, and seems on the whole to be the most important factor in determining his work in the classroom.'

The training college student of the period heard much of these developments. The novelty and importance of the psychological exploration of mental development sometimes threatened to swamp the studies of educational history and principles that also featured in the college course. In their report of 1943, the McNair committee on the Education and Training of Teachers defined the object of 'principles of education' as to 'enlighten a student about the nature of educational processes and to enable him to appreciate their historical and social significance.' The committee tended to play down the psychological element of the course, believing that some specialist lecturers 'exact too large a proportion of the time available and expect too much of their students.'

During the early and middle 1950s the number of students in colleges of education increased only slowly, and there were few major developments in the organisation and content of the college courses. The reports of the National Advisory Council on the supply and training of teachers published during this period considered the place and role of main subject and professional courses, with particular reference to the three-year course of study that had been recommended by McNair. The Association of Teachers in Colleges and Departments of Education and other bodies organised courses and conferences at which educators of teachers were able to discuss their work, and articles appeared from time to time in *Education for Teaching* and in a few other journals concerned with the content and teaching of 'Education' and with practical work in schools. As the enquiry conducted by the British Psychological Society and the ATCDE showed, by 1959 the education course was still treated as an integral whole in a large number of colleges, with little attempt made to differentiate out the contribution of the various disciplines that underlie educational study, and with groups still constituted according to the type of school in which the student eventually planned to teach. Among the factors that help to account for the persistence of this unitary, age-group based approach to educational studies were the shortness of time available for education, the lack of attainment and intellectual motivation on the part of many students, and the small number of staff with specialist qualifications. Some features of the ideology of teacher education, with its stress upon close student/tutor contact and anxieties regarding the effect of an academic and intellectual approach to teaching and learning on students' attitudes also played a part.

But if the 'fifties registered little change on the surface, there was a good deal going on elsewhere in the social and educational environment that would, in due course, begin to have an effect upon the development of education studies in the colleges. Many of the most vital decisions were being taken by parents; the forecasts of increasing population in the next decade showed the need for the rapid expansion in the numbers of students in training that started in 1959 and has been

going on ever since. Technological and social change, in particular the need for higher order skills and knowledge on the part of the employed population as a whole, and a shift in the traditional pattern of intergenerational authority, combined to emphasise the greater importance of education of all kinds to the economic and moral health of society. Larger numbers of students were pursuing advanced studies in education in universities, and acquiring not only the qualifications that would enable them to obtain appointments in teacher education, but also a different orientation to the content and scope of educational studies. The Ministry of Education (as it then was) in co-operation with the education section of the ATCDE, sponsored an important series of conferences on the education course, which over a period of years brought together several hundred of the growing number of lecturers concerned with eduction in the colleges. Within the universities, where education had long led a Cinderella existence, there was a marked increase in the volume of research on educational problems and in the number of lecturers and other staff appointed. Some of these university teachers of education devoted themselves to the development of aspects of educational study that had hitherto played little part in the work of the colleges, and through their publications, their teaching and their students, began to have an important influence on the organisation and content of education courses. Most recently of all, the need to construct syllabuses and teaching programmes for the BEd degree has given rise to a good deal of discussion and debate about what should be taught, when and by whom.

The Nature of Educational Studies

The effects of all this has been to alter quite radically the way in which educational studies are conceived. There is now a fairly general acceptance of the view that education as such is not a separate discipline, but a *practical theory*, the elements of which stand or fall on the validity of the empirical, philosophical, historical, moral and other forms of knowledge that provide their justification. This is not a mere semantic quibble. To recognise the distinctiveness of these forms of knowledge has important implications for the way in which we organise programmes of study, from the first years of the college course to higher degrees in education. We can no longer justify the consideration of educational issues *sui generis*. Take, for example, a concept such as *selection*. As soon as we start to probe beneath its surface we find ourselves involved in a bewildering range of questions. What are the forms of manifest and latent selection present in the operations of the educational system? What is the psychological rationale of the devices that are used to aid specific processes of selection? To what extent does the recent history of education help us to account for the patterns of selection that exist? What are the institutional and organisational concomitants of selective processes in education? How have attitudes to selection been modified in the light of changes in the division of labour consequent upon technological innovation? What are the ethical considerations involved in selecting and rejecting pupils for different kinds of schools and courses? How far should the family be accorded a role in influencing the selective process? The answers to these questions cannot be sought directly within a theory of education. Such answers can only be sensible if they are firmly rooted in the language and literature of philosophy, psychology, sociology, history and morals.

This is as true of the validation of educational *techniques* as it is of the explication of educational concepts. Any such technique implies a series of assumptions about the nature and the needs of children and of society, about the structure of experience and the goals of educational effort. The use of the teaching machine, learning by discovery, the integration of traditional subjects, team teaching, streaming and setting, all implicate us in acting upon a variety of assumptions about children, society, and the nature of the learning process, all of which have to be disentangled and examined if we are to understand fully what we are about.

The study of education as a whole has benefited enormously from the conceptual refinement and procedural clarification of recent years. But the implications of this trend for the organisation and content of education courses in colleges of education are by no means so simple or obvious as they are sometimes assumed to be. It is one thing to conceive of educational studies as a field of activity in which philosophers, psychologists, sociologists, historians and educationists each have important parts to play, and in which the contributions made by each of these must not be confused. It is quite another to construct a programme of studies appropriate to the needs and interests of students in colleges of education. While such a programme must necessarily reflect recent trends in the study of education, it is unlikely to be effective if it merely reproduces the pattern of advanced work for higher degrees and the organisation of research activity. The status and respectability associated with being a lecturer in educational psychology, or in the sociology of education, or in philosophy, may come to stand in too marked contrast to simply being a lecturer in education. There are signs that this is already happening, and that the new way of looking at educational studies, for all its advantages, is tending to compartmentalise the work of some colleges and departments.[1]

There are several considerations that have to be taken into account if these dangers are to be avoided and we are not to fall back upon the vagueness and conceptual inadequacy of the earlier age-group based tutorial teaching.

In the first place, there is demanded a clear understanding of the different kinds of knowledge that are involved in, on the one hand, learning principles and rules and, on the other, executing performances. In Scheffler's words, we need to be able to disentangle what is involved in knowing *that*, knowing *how*, and *being able*. Facts and rules relevant to teaching and the assimilation of education 'principles' are never in themselves enough to ensure a satisfactory level of performance. In Oakeshott's terms, principles of this kind are 'never components of the knowledge that constitutes the performance. They belong to a separate performance of their own—the performance of explaining a performance.' We recognise that every teaching act, every educational decision, embodies a range of theoretical assumptions of some kind or another. But we cannot hope to alter classroom practice and educational decision making simply by analysing the nature of these assumptions and supplying teachers and students with some verbal statement of our results. The link between theory and practice is real enough. But the

[1]See *Trends in Education* No. 9, 'Theory and Practice in Teacher Training' by R. S. Peters.

individual decisions, institutionalised procedures and group processes that enter into every practical teaching act are not directly amenable to the influence of theoretical analysis. We are likely to be disappointed if our teaching reflects the assumption of any such link.

Secondly, the psychology of the training process needs to be better understood. What are the particular skills, techniques and kinds of knowledge that the teacher needs to perform his task, and how is practical competence in these best acquired? Since the activities of teaching and learning are so complex, we often fall back upon highly generalised answers to this question. The teacher must be educated as a person, must display maturity, must be flexible and adaptable, responsive to the needs of children. These things are important, perhaps more so than the acquisition of specific skills, but this is no argument for not trying to identify the skills that the teacher needs and finding means whereby effective instruction in them can be provided. The quicker that the basic skill element can be assimilated into behaviour, the quicker can 'the naturally limited channels of conceptualisation and verbalisation (be freed) for other activities such as scanning ahead (thus permitting anticipatory action) or for more extensive monitoring of the task scene, or for scrutiny of response feed-back, or for improvisation and decision-making.'[1] The not infrequently found combination of high order value commitments with low order teaching skills is disastrous for the effectiveness of the beginning teacher, and destructive of his opportunities to profit from experience.

Thirdly, we need to give more attention to the institutional framework within which the future teacher will have to operate, and the impact of this upon his performance. There is in most education courses a proper stress upon the education and guidance of the individual child, but little time is given to examining the organisational pressures that can both facilitate and constrain the teacher's efforts. To discuss the nature of staff relationships, problems of authority and status stresses within the school may at least sensitise the student to the part that group process can play in the determination and achievement of educational objectives.

Organisation and Conduct of the Education Course

We are faced, then, with the task of constructing an education course that takes cognisance of the complexities of the relationships between theory and practice, which reflects our new understanding of the nature of educational studies, and which takes into account the fact that most students will go on to teach young children. At the same time, we have to devise methods of teaching this course which enable conceptual knowledge and practical experience to interpenetrate and fructify each other, and which reconcile the achievement of high academic standards in college with the realities of the classroom situations within which students will work. This will not be achieved by laying on separately taught and rigorously examined lecture courses in the sociology of education or child development. Neither will it be achieved by the fashionable device of teaching students by the same methods that are appropriate to primary school classrooms. Students are not children; their capacity for conceptualisation, although perhaps less well-

[1]See Miller, R. B. in *Training, Research and Education* by Glazer (Ed.) N.Y. 1965.

developed than that of some of their contemporaries who are in universities, is such as to make them react negatively to the over-use of discovery and project methods in education courses. Criticism of such approaches seems to be rather common, and may have something to do with the influx of lecturers into the colleges who have been excellent primary school teachers but have no experience of working with young adults.

Since all the types of knowledge, experience and skill that are needed are unlikely to be found in the person of more than a very small number of exceptional individuals, it is important that the members of the education department should operate very much as a team. For certain purposes it is equally important that *all* members of the college staff should see themselves as part-time and occasional members of this team, especially in the planning, execution and evaluation of practical work in schools and elsewhere. The particular content of a course taught by a team of tutors should to some extent depend on the range of skills and expertise that is available within the team. Fortunately the education syllabuses of most colleges and area training organisations are sufficiently general to allow a good deal of scope for individual variation.

One of the weaknesses of a programme of studies in which a large number of different tutors take part is its apparent lack of structure, especially when seen from the students' point of view. Some would argue that there is much to be said for not meeting the students' expectations of a highly structured course, and for trying to provide the kind of cognitive and experiential environment in which problems can be identified and appropriate solutions devised. But this kind of non-directive teaching requires particular skills that may not be possessed by everyone in the team. Any apparent formlessness can be avoided by spending a good deal of time on the planning of the course, and by making sure that students are kept fully informed about the overall plan, and the contribution that each series of lectures, seminars and sequences of practical work is intended to make to the whole. Three years is a long period through which to maintain a sense of direction and purpose, but if this is not done much of the value of the three-year course of preparation can be lost.

The chief organisational problem is that of securing some measure of integration of the various elements of the course, without at the same time confusing students about the types of judgment they are called upon to exercise or demanding too much of them by way of abstract generalisation. Within recent years a large number of schemes have been developed in colleges to secure these ends. Many attempt, in the early part of the course, to bring students face to face with educational problems and issues that force questions which can only be answered in terms of the disciplines that underlie educational study. The psychologist's contribution to the study of individual differences can only be seen as relevant to the teacher's task after there has been some opportunity to feel the significance of these differences in the classroom; the philosophical problems of equality take on flesh and blood when the tensions and difficulties associated with success and failure at the major watersheds of educational progress are observed and examined; the sociologist's notion of sub-cultural differences acquires significance after the effects of streaming have been looked at and discussed. But the making of these links between experience and

cognitive understanding needs to be very carefully planned and followed through; without the imposed structure of the textbook or series of formal lectures, it is all too easy for the effort to expose the inadequacies of students' existing attitudes and assumptions to become hopelessly bogged down in a welter of unsecured concepts and unresolved questions. Reliance cannot be placed on the traditional period of observation in schools as a means of suggesting appropriate problems; all too often students do not know what to look for and have no conceptual framework within which to arrange and evaluate what they see. Among the techniques that can be employed in the early stages is to require students to present their experience in the form of case studies, written up within the context of an imaginary school, the details of which are provided before the period of practical work begins. A series of these, edited and produced as a mimeographed case-book, can provide a good deal of material from which the threads of more systematic lines of enquiry can be spun.

As the course proceeds so the treatment of educational issues can be formalised, and its elements can begin to reflect the logical form of the parent disciplines. A measure of specialisation in the third year enables students to assimilate more of the language and grammar of one or other of these, and thus to modify the way in which they perceive the educational realities they encounter both in and out of the classroom. It is this subjective transformation of experience that is at the heart of the purposes served by the study of education in the colleges.

The integration of practical work in schools and courses in education is a subject in itself. Ideally, there is no sharp distinction between the work that goes on in lecture room, seminar, classroom and youth club. The wider use of closed circuit television, one-way observation screens, tape-recorders, film loops and other devices is facilitating the making of connections, and on the campuses of many colleges there are nearly always classes and groups of children working with tutors and students on a variety of practical activities. But there are still difficulties in the way of reducing the discontinuity between work in college and work in the schools. Some of these spring from the problems of finding school practice places; students are scattered over a wide area, often many miles from the college, and they sometimes live away for the period of the practice. There is growing dissatisfaction with the traditional pattern of supervision; it is costly both in terms of money and tutors' time, and its usefulness to the student is questionable. Some indications of future lines of advance in this field were provided by the Department of Education and Science in Circular 24 of 1966, and the Department is also financing a study of practical training being carried on by Miss Edith Cope at the University of Bristol. Eggleston and Capari have described a mode of group supervision that is now being tried in a number of colleges, and there is much of interest to be found in the reports of the programmes of school-based training carried out by Harvard University in association with the Newton and Lexington school systems.

Another aspect of educational studies that is at present somewhat undefined as to scope and content is that of the curriculum subjects. Nearly all colleges require their students to take some courses in subjects that they are likely to have to teach but which they have not studied to main subject level. The number and range of these varies a good deal; they are sometimes combined with forms of practical

work such as group study practice, where a number of students and their tutors spend half a day a week or more in a school working with one class of children in a particular subject or subjects. Curriculum courses nearly always have a fairly heavy emphasis on methods of teaching rather than content. Their relationship to main subjects is not always clear, and there is much to be said for at least examining the possibility of substituting a number of more rigorously pursued curriculum courses for some existing main subject work, especially in the case of students preparing to teach in primary schools. Already there are colleges where all students, whatever their specialism, undertake a variety of courses in both the sciences and the humanities. At Kingston-upon-Hull, for example, students take at least one full year's work in English, mathematics, natural science, social studies and creative arts.

The departmental organisation and staffing structure of some colleges militates against curriculum courses being given the attention they deserve. The subject departments are geared mainly to the needs of specialist students, while the education staff either lack the necessary background in the subjects or are too preoccupied with other work. In at least one college a radical attempt to integrate main subject courses and education has taken the form of regarding every member of staff, whatever his subject interest, as a lecturer in education, and avoiding the creation of a separate education department.

An unparallelled volume of educational research and development is at present being undertaken in this country. In the years to come we can expect to see more and more of the results of this work being incorporated in the courses pursued by students in colleges of education. The new approach to educational studies that has been described in this article, with its stress upon systematic investigation of educational practices, the rigorous analysis of educational assumptions, and the making of explicit links between theory and practice, is well adapted to provide the framework within which the new knowledge can be evaluated and presented for the use of the future teacher.

What educational tasks does the tape recorder enable us to undertake? What limitations are imposed by the manner in which it performs its functions?

The World of the Tape Recorder

PATRICIA BIGGS

In the opinion of some teachers the language laboratory is a stultifying place, where the student is put as it were into a strait-jacket, strapped into a booth and made to respond like an automaton to a disembodied voice. Such critics must have had their worst fears confirmed when, during a broadcast last year (one of a series on advances in language teaching), it was suggested that a major advantage of the laboratory is that the repetition exercises and the structure drills which can be performed therein take much of the drudgery away from the teacher, and that at any rate the duller children would sit contentedly repeating the mechanical fodder offered for their consumption. And it is not only at school level that this conception of the role of the 'ironmongery' can be paramount; in some universities, too, it is considered that the machines have their proper place only as aids to the acquisition of the fundamental *mécanismes* of a foreign language, before any real study can begin.

Unquestionably the laboratory has the invaluable qualities of a patient household drudge. But even in its present state of development, the laboratory can also inspire much more varied, sophisticated and interesting tasks. For the teachers and for the students who are prepared to become skilled operators, these special tape-recorders can become very flexible personal assistants.

Let us consider first of all the machine itself—the language laboratory tape-recorder—from three points of view: how it functions, and what operations are possible, in conjunction with the console; how the teacher can intervene and control its functioning; and how the student works when he is operating his machine. The details of the manipulation of the controls can be taken for granted; it is more important to investigate aspects of the nature of the possible operations. I shall try to show the significance of these operations for establishing the nature and the range of work which can profitably be done on or by means of tape. The context will be that of the spoken language in general, including work related to studies both in the mother tongue and in foreign languages.

The machine's basic function, that of storing sounds and reproducing them accurately, again and again, makes of speech something almost unexpectedly and uncomfortably stable. What may be spoken with casual, extemporaneous ease loses its provisional character and is suddenly as indestructible and as inescapable as the written word. This new inevitability of recorded speech has led quite naturally to the assumption that when recordings are used in education, they should function more like textbooks than like teachers. Speech

becomes, in this situation, no longer an improvised free interchange between teacher and student (discovered on re-hearing to be imperfect and wasteful), but a prepared, authoritative *text* to be systematically studied; or a carefully controlled *exercise* in which the teacher's contribution is perfected and the student's response is predetermined —so that he, too, may produce something which is worth preserving.

The relationship between the console and the student's machine, as it exists at present in most laboratories, reinforces this point of view, and has perhaps been developed in this way partly because of it. Once the text or exercise has been broadcast from the console and each student has his copy, the teacher can eavesdrop, or interrupt the student's activities, but cannot normally contribute directly to the existing recording on an *ad hoc* basis. After a certain amount of laboured switching, he can alter the recording or add to it, for an individual student or for a group; but this does not alter the nature of the situation. Work in the laboratory consists of a dialogue between the master track and the student, from which the teacher himself is largely excluded. The teacher's role is thus much less creative than it is in class. At the beginning of a session, text or exercise must be ready; it cannot be developed freely during the course of the working time. The menu has to be *table d'hôte* rather than *à la carte*.

All this is no doubt very good medicine for teachers, at all levels of education, who now feel called upon to prepare their speech as carefully as they would a teaching textbook; likewise for students, who have to learn to live with a situation in which their words are automatically taken down and used in evidence. Nevertheless, if such a conception of the role of recorded speech remains dominant, it encourages, I believe, far too narrow an understanding of what could be meant by education in sound. The tape-recorder has not been in common use long enough for human beings in general to lose their self-consciousness about recorded speech; we still feel that we are 'on show', that a recording is in many ways a 'performance'. When we come to elaborating principles for using recordings in education, we underestimate the extent to which the machine can be a most valuable instrument for practice, as well as performance. For, just as the master track can be the equivalent of a textbook, so the student track is the equivalent of an exercise book. That is to say, it can be used as a means of drafting, practising, preserving for as long as it seems worth while, all kinds of exercises which come at an intermediate stage on the way to some future, hypothetical performance.

Flexibility of Operation

Exercises in writing, which are not only of the kind in which all the answers are either right or wrong, often involve the student in a problem to which his response is judged to be of greater or lesser adequacy, interest, depth, skill. These are of the greatest value in developing the student's control of his own thought. Is it possible for the tape-recorder to help us to organise analogous stages on the way to different kinds of control of the medium of speech?

Certainly there seem to be few technical limitations, when we reflect upon the variety of operations possible on a student's tape-recorder. Flexibility in the possible arrangements of the recording on the two tracks is reflected in the range of activities at the disposal of the student.

He can listen to both tracks or, in some laboratories, silence one in order to listen exclusively to the other. He can speak without recording. He can record on his own track, intermittently, in response to the master track, or continuously if the master track is left blank. He can allow the tape to run its course, or stop and move forwards or backwards at will. He can erase and re-record his own efforts indefinitely (by a rather more effective process than that of erasing ink from paper). He can combine listening with reading or writing.

These activities form the foundations of a multitude of specific tasks that the student can be asked to undertake. He can listen to a continuous or an exploded text in order to grasp its meaning, absorb the information, or memorise it by ear. Synchronising his own voice with that of the speaker, he can attempt to imitate him in order, by active means, to study or practise phonology, intonation, rhythm, or idiosyncracies of speech. He can practice the essential speech patterns of a foreign language, in the form of structural exercises where each stimulus calls for one predetermined response. In exercises outside the boundaries of these categorical imperatives, he can be asked to respond to other kinds of stimuli, with varying degrees of freedom. It is possible for him to answer questions about a text he has heard or read; summarise or interpret facts given; compare two statements one with another (for example, discriminate between meaningful and meaningless statements); expand into two or three sentences the ideas expressed in one; explain and analyse the context of a statement; give a personal reaction, or a reasoned answer, to a more general question. With minimal stimuli, or none at all, on the master track, the student can be asked to describe or analyse a picture or moving film, or to make an extended speech—rather as he might be asked to write an essay. The one thing which the machine does not enable him to practice is, curiously enough, the one skill it is commonly supposed to help him to improve; free conversation with an interlocutor. However, the extent to which it is possible to engage the student in a controlled conversational situation, in which he practises responding within a framework, is not yet fully explored.

This list does not by any means exhaust the possibilities for working in sound, and does not touch on those for combining the spoken with the written word. A detailed discussion of individual exercises would be too long to be included here; one or two observations may nevertheless be appropriate. In those exercises where there is more than one possible response, freedom need not always be as uncontrolled, as hazardous as it might appear. Let us consider the exercise of explaining and analysing a context. At a relatively early stage of learning a foreign language, the context can be concrete, and precisely defined: the task would be, for example, to express in words the situation in which a certain sentence, which he has already heard, was spoken.

'Another slice of bacon, please dear, and some more toast'. Said in a man's voice, this scarcely even needs the prop of the remembered situation. At a much more advanced level, one which is worth while also in the mother tongue, the context demanded can be much more abstract, while still being confined:

'The winds of change are blowing through Africa today . . .' The purpose of exercises such as these is to train students to think and to speak in a controlled situation, to order their words and to time them

properly, in order to make a point. Restricting oral exercises to those of automatic response, or, at the other extreme, simply offering the students opportunities to speak, will no more train them to 'think in speech' than the bare, intimidating instruction to 'write an essay' will train them to construct a good piece of writing.

For standards of comprehension, appreciation and fluency in the spoken word should not, I believe, be established in relation to the ability to comprehend or produce an unstructured stream of speech about nothing in particular. We need standards of coherence, relevance and effectiveness as rigorous as those by which we judge the performance in the written word. An example of judgement by oral performance already long established is the *viva voce* examination held as part of the final assessment for some university courses. It would be interesting to survey the ways in which students are trained specifically for this ordeal.

Comparisons with other Media

With the tape-recorder now at our disposal, we are beginning again the formidable task of establishing principles and organising methods of work in the medium of sound. Making comparisons with other media, we can suggest tentative criteria, follow experimental lines of development, adjust the balance of our teaching. We can suggest, for instance, that we should see what happens if, in these new conditions, we return to methods abandoned ever since the written word predominated. We can set our students the task of relying entirely on their ears and their voices, not even allowing them to make any notes, in order to dominate a whole theme of study, within a period of perhaps a week or a fortnight. What we cannot do yet is to claim that our purposes are finally established. What kind of skills we should encourage, in so far as education in the spoken word may have a vocational application? What kinds of receptivity and active response should a truly liberal education produce? How will these relate to examinations and evaluation procedures? There are also some fundamental problems of technique to be solved. I have mentioned the operations which a student performs at his machine: listen, stop; rewind, repeat, stop; record, rewind, repeat. What is the wisest and most efficient sequence of activity? Our civilisation seems normally to set a premium on performances completed *d'un seul trait:* why else do we set examinations which demand that three or more essays be written within the space of three hours? If we accept this, should students be trained out of the habit of practising in fragments? Should we always demand that answers on tape should be produced as a whole, and not piece by piece? These questions are, of course, a reformulation of some of those now being urgently asked in relation to education in general, whatever the media of communication. It seems particularly opportune to ask them at this moment in relation to the spoken word, before old habits of thought become irrevocably transferred to a new situation.

I have deliberately omitted until now any mention of one particularly severe limitation which still applies to all work in sound of the kinds described. This is the rigidity of the time-scale imposed by the way in which the machine functions. As far as tape-recorders are concerned, time is not relative at all: it is a length of tape, whose duration is unalterably fixed. Play it faster, and the chipmunks laugh back at you.

The printed page, on the other hand, reveals its contents as fast as eye and brain can absorb them, which at its best is considerably faster than the normal speed of speech. For the purpose of finding a particular reference, the eye can move faster still, scanning page after page. By comparison, the speed at which a reference in sound can be sought is lumbering and inefficient.

If many of the opportunities for using the tape-recorder in education have not yet been investigated, one of the reasons is assuredly this single handicap. For, to look at one of the important problems resulting from it, setting any kind of question to which there is more than one answer creates a need for assessment and correction; students cannot learn from uncorrected mistakes. The assessment of tapes demands of teachers a quite impracticable quantity of time, except where classes are very small. No wonder that the response to this situation has been to set no active exercise in which the answers are not inevitable and, preferably, inserted on the tape itself as a self-correcting device.

One solution to the problem of marking is to compromise, to some degree, with the principle of 'no exercise without correction'. It is in fact surprising how much can be gained by liberating students from the shackles of the predetermined response, and allowing them to practise independently and without correction; an occasional tape completely assessed and discussed is gratefully appreciated, and one wonders whether the more noticeable impact of less frequent marking does not compensate a little for the lack of a regular dosage betweenwhiles.

But a more general solution to this problem will be possible when it is recognised that the difficulty is a technical one, connected with sound recording itself. We have become used to technical problems being solved, and a recent report from America indicated that a method of playing recorded speech at increased speed, without unacceptable distortion of articulation and pitch, had been invented. It is apparently a device intended for blind users, but in our own context, if widely available, it could have many invaluable applications. Although we do not yet know in what circumstances and for what purposes it will be appropriate to listen at higher speeds than human beings normally speak, we can be sure that, as with the tape-recorder itself, we shall learn to use the new device for purposes which go far beyond those which its inventors had in mind.

Work with the 'unattached' has contributed a great deal to our knowledge about young people. Dr Smith of the Department of Youth Work at Manchester University examines this point where social work and the youth service meet.

Social Work Method and the Youth Service

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The youth service is once again in a state of ferment about its proper role in the social services today, and a great many ideas are being canvassed about its future. One proposal which is now finding favour with some local authorities is to strengthen the links which the youth service has with further education, and in particular with community work, the rationale for this policy being that the youth service has never had much impact on the upper end of the 14–20 age group and thus a virtue can be made of the necessity of giving up work with the younger adolescent. The young person will be given greater encouragement to look forward to his adult responsibilities and discouraged from thinking of youth as an isolated age group.

This proposal clearly has merits, and a second proposal to assist in the future development of the youth service, which is to be discussed in detail here, should not be thought of as an alternative, but rather as a complementary proposal. This second proposal is for the service to give more attention to the adolescent who is below average in individual and social development, and in order to do this to make much more use of the principles and methods of social work. The case for this second proposal will not be argued in general terms for there is no shortage of concern about the problems which young people are presenting in Britain today, nor of prescriptions for their welfare. The purpose of this article will be to discuss in concrete detail what social work method has already achieved on a small scale in experiments with the so-called 'unattached,' and to draw out its implications for the youth service. It is essential, however, before describing these experiments to stress how dependent the youth service is upon the contribution of education, and what different approach would be needed in the wider use of social work method. The youth service is both nationally and locally a part of the educational administration. Furthermore not only do LEA youth clubs depend for most of their part-time leaders upon the services of teachers, but club work has been growing at a very rapid rate in schools and many local authorities are now employing teacher-youth leaders. This trend will be very much speeded-up as the recommendations of the Newsom committee are put into effect. Over thirty colleges of education are now training teachers in youth leadership.

Social workers and teachers are still two very distinct professional groups and despite the moves for closer association initiated by some universities and colleges of education, their training is carried on in different places and shows remarkably little cross-fertilisation. Each

profession has its own tradition of practice and seldom are they to be found working side by side in the same institution. Such factors accentuate the real differences in principles and methods employed by the two professions. Both work with people, but whereas the teacher has to have concern for his subject as well as for his pupils, the social worker is person-centred only.

The social work method is based on a careful assessment of the emotional needs and social situation of the client, and the worker consciously uses his own self to help the client resolve his own problems. Furthermore, social workers consider it essential to convince their clients that whatever they may do, they will still accept them as persons and try to help them, although they cannot condone their behaviour. It is this method which has been used with striking effect by the National Association of Youth Clubs, the Young Women's Christian Association, the Bristol Social Project, the Youth Development Trust, and a number of other voluntary organisations in recent years. Some projects have stressed work with groups more than others, but all have tried a mixture of casework, group work and community organisation. Generally the work has been designated as work with the 'unattached,' and this has been taken to mean not just unattachment to youth organisations but 'unattachment to a much wider variety of opportunity and service.' In one study, unattachment is defined as 'a conflict in expectations between those who offer the service (clubs, youth centres and others in the youth service) and those —the young people—who want and need it but who are unable or unwilling to accept it on the conditions on which it is offered'.[1]

Making Contact

Work with the unattached presumes that contact has been made with them, and that they are prepared to remain in what is a voluntary relationship with social workers. It is now clear from a number of projects that contact can be established with even the most anti-social youths, but what is still in need of further investigation is what can be done once the contact has been made. Generally, contact has been established in one of two ways; either by providing some amenity, which by character or location makes it easy for such young people to move in or out, or by going out to look for them in the places where they are known to congregate. Coffee bars and experimental clubs, the first of these two ways of making contact, have been the most popular method in the past, but they are now becoming much less important than detached youth work, the second approach.

If effective relationships are to be developed, the social worker can only work with a small number of young people, and he must give himself sufficient time. In general it would appear that he cannot work intensively with more than three small groups concurrently and perhaps also a few individual cases; certainly no more than 20 clients in all. He often must allow himself as much as six months before the relationship can stand any real weight. Mary Morse reports for the project sponsored by the National Association of Youth Clubs that 'the three workers succesfully located, contacted, and developed relationships with 170 to 200 unattached youth mainly in the fourteen to twenty-one age group.'[2] This was achieved 'within periods of time varying from

[1]George W. Goetschiug and M. Joan Tash, *Working with Unattached Youth*, London, 1967.
[2]Mary Morse, *The Unattached*, London, 1965.

six weeks to five months'. Goetschius and Tash report for the London YWCA project, that, 'During the three years of field work, at least 326 boys and girls were known to the workers (five). Of these, at least 236 participated in the programme erratically, and 159 (88 boys and 71 girls) received help individually and in groups for periods up to three years.' They added that 'Relationship building is a long, slow process.' In the Manchester Youth Development Trust project, the same group of boys is being worked with over the whole period of the experiment. The team of four professional workers can usually call upon thirty voluntary helpers, and the core group of 71 boys receives a minimum of one session per week, either on an individual or a small group basis. A hundred other young people receive a less intensive service. It took many months at the beginning of the project before young people moved from an exploiting to a reciprocal basis for the relationships.

Although the social work approach is person centred there is a place, especially in group work with young people, for activities. But most activities require some skill, and most skills require practice, and this is precisely what the unattached youth is often unable to accept. He lacks discipline and persistence and unless he is constantly supported and encouraged, his participation in activities will be erratic and short-lived. Furthermore, many activities involve co-operating with other people, and observing fixed rules, but the unattached are often socially immature and unable to forgo their own satisfaction for the benefit of the group. Very great care has therefore to be exercised in the choice of which activities to encourage, and when to encourage them.

The earliest efforts which the social worker makes in doing something with a group must make very little demand upon them. It may just mean driving them around the neighbourhood, or into the town centre. They may be encouraged to visit the coffee bars in town rather than the cafés locally. Later they might be interested in going to a concert or a theatre, rather than the usual round of cinemas. Much later still they might be stimulated to go somewhere different for their holidays or to go camping, but even the most aggressive six-footer can become very timid once he gets out of his own district and away from his usual routines, and he will need somebody to hold his hand. Given this support he will try most of the orthodox activities to be found in a good youth club, and most projects report considerable success with film-making, drama, voluntary service and other groups.

Activities account for some of the time which the social worker spends with the unattached, but more often he is likely to be found talking with them on street corners or sitting with them in public houses and coffee bars. He may visit them at home and meet their families or he may entertain them in his own home. He may be called upon to help them find a job or to speak for them when they appear before the magistrates. In the YWCA project the weekly average time spent by each staff member on 'programme' was 12 hours as against just over seven hours for other kinds of field work, but this is probably higher than in other projects, and in any case 'programme' is a much wider concept than 'activities.'

Relationships with the unattached require considerable skill and emotional toughness on the part of the worker, especially in the early phase when he is tested out. He must be prepared to cope with a great deal of aggression but very seldom is this other than verbal. If

he wishes to maintain the relationship he must also accept that they use bad language freely, often drink alcohol under age, and commonly steal, but always he has to make his own standards clear. He has to balance the good which comes from their confidence in him against his, or his agency's, concern that he should keep to the right side of the law. He is their link with the respectable adult community and it is important for him to keep it open not only to mediate on their behalf, but also in order to represent the interests of the community to them.

The social worker is skilled at helping people make their own decisions, but it is this which the people he is called upon to help are least able to do. They find it difficult to decide what job they are going to do when they leave school and difficult to commit themselves to regular work habits. They find it threatening to break away from the traditional routine of the street corner, the local cinema and the public house. They are easily swayed by their own emotions, and their desire to be accepted by their group.

The social worker appreciates that if the young person is to be helped, he must learn among other things to become more aware of his own self. Normally the aim would be to achieve this objective by reflecting the client back to himself in the course of counselling interviews. It is seldom, however, that anything so systematic can be achieved in work with the unattached and workers would feel that real progress was being made if a young person talked about himself in a detached way, and this may well happen in unusual situations. Many workers have commented on the revealing conversations they have had when driving their clients somewhere in their cars. It may seem odd to a middle-class observer that a sixteen-year-old boy with a new unskilled job every month does not see that something is wrong, but it may be a tremendous break-through for that boy to begin to see that he is repeating a pattern, and to begin to ask himself why he does so.

It is now time to draw out the implications of this experience for the youth service, but it would be wise to remember how slight the experience remains. There are still only four books and half a dozen articles documenting this entire field, and the work continues to be on a small scale with currently only twenty projects throughout the country, employing about thirty workers out of the 1,400 employed as leaders in the youth service. There is surely room for most local authorities to build at least one project into the normal structure of their provision, if not in the youth service then as part of the preventative work of the children's department under the Children and Young Persons Act of 1963.

Concern for the social development of young people is now growing in our schools and more interest is being shown in the emotional problems which adolescents experience. Social workers and school counsellors are being employed by some of the more progressive local authorities, and school curricula are being shaped around the child's interests and needs. Such concern is not new to the youth service as its main function has been to help young people grow to maturity through social experience, but there has always been the danger that the service would not reach those who most need it or would not have the specialist skills to deal with its problem children. This danger could be more confidently tackled if the service were more responsibe to the principles and methods of social work.

Different political and economic systems often seem to throw up similar educational problems. Just as in Russia (see Trends No 4*) so in Czechoslovakia, problems of scarce resources and differing viewpoints have to be faced.*

Education in Czechoslovakia

The educational visitor to Czechoslovakia cannot fail to be impressed by the considerable efforts the Czechs are devoting to extending and improving provision for education at all levels; nor can he fail to notice the many astonishing resemblances between their problems and our own. He will find complaints about lack of nursery and kindergarten places (despite the great number of such places already provided) and controversy about teaching methods in the junior sections of schools. Parental protests against the introduction of streaming for the 11–15 age group is widespread. There is a tendency on the part of the better students entering university to choose the humanities despite the official policy of encouraging them to take science and technology; this is producing severe competition for a restricted number of places in the humanities. Institutions of higher education criticise the products of the secondary schools; similarly the secondary schools themselves are less than enchanted by the standards of the primary schools. Educationists complain about the attitude of industry towards vocational education, and of the quality of some of the practical training done in industry. Industrialists are allergic to the release of students from productive work, sceptical about the value of education, critical of the schools for failure to produce boys and girls with a full grasp of the three Rs, and criticise the products of higher education as unduly theoretical and academic. There is a shortage of teachers and there is much dissatisfaction with existing teacher salary scales.

These and other similarities are no doubt due to common problems of industrialised societies.

The Educational System

In a country where it is normal for women, including married women, to go out to work, it is necessary for the authorities to make arrangements to look after children below compulsory school age. In Czechoslovakia there are some 1,580 day nurseries looking after about 63,000 children up to the age of three, and 7,600 kindergarten attended by some 330,000 children between the ages of three and six. Despite this, there is still a great shortage of pre-school facilities because of the very high proportion of working mothers (44 per cent of the Czech labour force is female).

All children spend the period of compulsory education from age six to fifteen at a basic school for general education. In principle, the basic

schools are fully comprehensive and non-streamed, but a certain amount of experimentation with streaming is in fact taking place. Syllabuses, time-tables and text-books are prescribed by the Ministry of Education and strictly adhered to. There are 11,300 basic schools in the country, attended by some two and a quarter million pupils.

About 65 per cent of the pupils leaving basic school (140,000–160,000 a year) go on to an apprentice school to gain a certificate of apprenticeship in industry, agriculture, trade, etc. occupations. About three-quarters of the students take a three-year course, the remainder a two-year course, of combined education and training. Those who pass the final examination (written, oral and practical) become 'qualified workers' in their particular occupation or trade, and are henceforth entitled to the full wage applicable to the category in which they are placed. (Czech manual and craft workers are classified for wages purposes, within one of three broad classes, which are (i) miners and certain other essential occupations, (ii) other persons working under difficult conditions, (iii) others. The earnings in these classes are in descending order. Category 1 in any given class is that of unskilled worker, with succeeding categories representing added degrees of skill, experience and/or responsibility. A student who passes his final apprentice examination after a three-year education/training course would normally be placed in Category 4, but may be placed in Category 5 if he passes with distinction. Further experience and promotion can take him up to Category 8, which appears to be the highest.)

A further 30 per cent of the pupils leaving the basic schools go on either to one of the 650 vocational or secondary vocational schools or to one of the 370 general secondary schools to take a three-year course designed to prepare the students for university studies. About half the students going on to secondary education each year attend the vocational or secondary vocational schools (about 36,000 in an average year), and the other half to the general secondary schools. All secondary vocational and general secondary courses lead to a School Leaving Certificate at matriculation level, known as 'the Maturity'.

The remaining five per cent of basic school leavers go straight into unskilled jobs without undertaking any form of further education.

In all apprentice schools and secondary schools the syllabus, time-table and text-books are prescribed by the Ministry of Education, but some flexibility in the choice of text-books is being introduced in the secondary schools.

Selection and Streaming in Czechoslovakia

All basic schools in Czechoslovakia are run on a 'unified' basis, i.e., they are fully comprehensive and non-streamed, with every school teaching the same subjects for the same amount of time by reference to identical syllabuses and with the aid of identical text-books. At no point during the period of compulsory education from six to fifteen years of age is there any formal selection procedure designed to differentiate pupils of varying aptitudes and abilities. Teachers are, however, enjoined to 'regard every pupil as an independent individual who requires an individual approach, and to give special care to gifted pupils, to make higher demands on them so that their knowledge, skill and aptitudes do not get lost among the dull average.'

On the other hand, education after fifteen is highly differentiated in

curriculum, purpose and structure, to correspond to the different aspirations, talents and abilities of the students as well as to the requirements of the national plan, and all basic school-leavers are selected at 15 plus to go on *either* to apprentice schools to become operatives or craftsmen; *or* to vocational or secondary vocational schools to become medium grade technicians (or in some cases as a prelude to higher education); *or* to general secondary schools where they are, in theory, prepared for university studies (although in practice only about half of general secondary school-leavers go on to university, a situation which causes concern to the Czech authorities, who are giving the problem close attention).

It is interesting to know that some years ago certain Czech educationists took the view that there should be no differentiation at 15 years of age, that in fact education for all should continue on a 'unified' basis to 17 or 18 years of age, so that, in principle, all young people would have the opportunity of matriculating before starting a shortened apprenticeship or other vocational course. This was, however, dismissed as 'utopian ideas which were never adopted thanks to the outspoken criticism of the most experienced pedagogues.'

There is criticism in the secondary schools that the present 'unified' system of basic education does not give the best results, and that even the brighter young people reach the secondary schools deficient in a number of respects because they have been, in effect, 'lost among the dull average'. This criticism is echoed at one remove by the universities, who find some secondary school leavers so ill-prepared for higher studies that it is necessary to run special 'settling-in' courses for freshmen.

These criticisms have led to experiments in 'differentiating' (i.e. streaming) pupils in the last year of the basic school. These have been carried out on a considerable scale, in 630 primary schools spread throughout each of the 108 districts of the country, and were the subject of an evaluation conference under the aegis of the Ministry of Education in the spring of 1966. The general feeling was that the experiments had proved so successful that streaming should be extended to the penultimate year of the primary school, and ultimately to the seventh and sixth years (in which case streaming would begin at 11-plus). The greatest volume of opposition to the experiments came from the parents of less able children, who tended to regard the whole thing as an attempt to brand their children for life as 'inferior goods'. It is claimed, however, that the system of bringing the parents into close consultation in the streaming selection procedure has resulted in the disappearance of most parental opposition. Not only are parents consulted about the appropriate stream for their child; after full discussion, their wishes are decisive.

About 50 per cent of the students leaving the general secondary schools and 20 per cent of those leaving the secondary vocational schools go on to full-time higher education. This takes the form of a five- or six-year course at a university or other institution of higher education, or a four-year course at a college of education.

Much encouragement is given to people in employment to raise their educational standards at all levels, and part-time courses are provided at some works' schools and at all secondary schools and institutions of higher education, or the following broad pattern:

(*a*) Covering some two to four years of general study, and attended mostly by manual workers who wish to raise their general level of education;

(*b*) At technician level, covering five years of study (sometimes divided into separate lower and higher courses of three and two years respectively), and attended mostly by successful candidates from the apprentice schools who wish to follow a secondary vocational course leading to the 'maturity' examination;

(*c*) At university level, comprising five or six years of study and taken by employed persons already possessing the 'maturity' in order to graduate.

At the works schools the courses are given by way of evening classes (in practice, because of the early start and finish to the normal day's work, these are afternoon classes), but those at the secondary schools and the higher institutions take the form of correspondence courses and extra-mural classes as well as 'evening' classes. In 1965 some 50,000 students took part-time courses at works schools, 115,000 at secondary schools, and some 40,000 at the higher institutions.

Administrative Structure

The Ministry of Education is responsible for the entire administration of education in Czechoslovakia, except that the day nurseries and health services vocational schools come under the Ministry of Health. It has a number of bodies to assist and advise it, including a State Committee for Higher Schools, and various other committees advising on vocational guidance, the education of employed persons, adult education, and so on. It directly administers the universities and other institutions of higher education, and all the research institutes working in various educational fields. While the Ministry in Prague is the 'overlord' for the whole country, the Commission for Education and Culture of the Slovak National Council in Bratislava has partial autonomy in education matters in Slovakia.

Under the Ministry stand eleven regional national committees (eight, including one for Prague itself, in Bohemia and Moravia, and three in Slovakia). Following these come 108 district national committees, while each town and village has its own local national committee.

All these 'national' committees are organs of local government with, as in this country, delegated responsibilities for education, health, finance, and so on. The regional committees for education are responsible, within the framework of the national plan for education, for the administration of all apprentice and secondary schools in their regions. Each has its own regional inspectorate and institute of pedagogy (an institute doing some pedagogical research, but chiefly concerned with in-service teacher and instructor training and development, and under the general direction of the national institutes in Prague). The district committees are responsible for the administration of the basic schools. Here again, each district has its own inspectorate and a pedagogical centre where teachers from various kinds of schools can meet to exchange experience, and discuss matters of common interest with the district inspectors. Local committees appear to fulfil for the various schools in their own local areas (basic and secondary) functions which are an amalgam of those performed in this country by school management committees or governing bodies, parent-teacher associa-

tions, and to some extent the subject advisory committee of local colleges of further education.

Training for Industry

The Ministry prescribes in detail the programmes for all basic apprentice and secondary schools, laying down detailed syllabuses and timetables and publishing the text-books. It also states the general principles on which the life of each school, including extra-curricular activities, is to be organised.

Among the subjects taught in all schools is 'civics,' designed to acquaint pupils with the basic rights and duties of a citizen, and with the Czech economy and system of government. It also attempts to inculcate desirable qualities such as diligence, self-sacrifice, mutual understanding and patriotism.

History and Russian also figure largely in the curriculum. The first deals, against a world background, with 'the rise of Capitalism, its development and transition to Imperialism and, in the later stages, with the victory of Socialism in the USSR and the other People's Democracies'. Russian is compulsory from the fourth to the ninth years of basic school, and in the apprentice and secondary schools, but not in the vocational schools.

In preparing and reviewing the 288 different apprentice training programmes which exist, and the dozens of different vocational and secondary vocational programmes, the Ministry has the assistance of the Institute for Research into Vocational Education, as well as that of the different ministries controlling the industries which will ultimately be responsible for employing the products of the schools. There is a corresponding research institute to advise on the programme of the kindergarten, basic and general secondary schools.

In the field of practical training, the different 'user' ministries are responsible under the law for ensuring a sufficient quantity and quality of training for their respective industries. (In this respect they can be compared with the industrial training boards in this country, but taking their responsibilities as a whole, they are probably more akin to our nationalised industries boards than to 'ministries' in our sense of the term.)

However, the 'user' ministries must discharge their responsibilities for training by reference to conditions laid down by the Government acting through the Ministry of Education. To take the apprentice schools as an example, it is Ministry of Education which administers the regulations determining the conditions under which a training centre shall be set up in any particular enterprise; specifying the buildings, equipment and staff to be provided for such a centre, and the point at which training must be done off-the-job; and regulating the training of the apprentices, the length of their working-day, their wages, their safety. The Ministry determines the proportion of general and technical education of training for each year of the apprentice's programme, and prescribes the combined education/training syllabus after consulting the 'user' ministry on the training part of it. (It may be of interest to note that a 'teaching hour' in the educational part of the combined syllabus lasts in fact only 45 minutes, while a 'training hour' in the industrial training part is 60 minutes long.) The industry

concerned must meet the cost of providing the buildings and equipment for both education and training (including hostels for the apprentices where necessary), the salaries of the director and instructing staff, and the wages of the apprentices. The Ministry's financial responsibility is limited to the cost of the salaries of the teachers engaged on the educational side of the combined programme.

Besides its large and closely-defined role in the training of apprentices, industry in Czechoslovakia is also called upon to take students from the vocational secondary schools and the universities for practical training periods at various stipulated points in their educational courses. This form of practical training is not so closely controlled by the Ministry of Education as is the case with apprentices; the arrangements in the particular case appear to be left largely to the educational institution and the industrial enterprise concerned, although the Ministry does intervene in the question of conditions (including salary) and hours of employment of the students. In the case of secondary school students and, in the later stages of their university course, the undergraduates, the practical training periods and associated project work are carried out with the enterprise which will be the student's future employer. Contracts of service are, in fact, usually signed between the student and the enterprise before the educational course has been completed. In general, the educationists do not appear to be particularly happy about the quality of such training, feeling that industry could do a good deal better were it more concerned with training and less with production. This complaint is a reflection of the attitude of industry even at lower levels of training, as the Ministry of Education encounters much pressure from 'user' ministries for less training for apprentices. In Czechoslovakia, as elsewhere, the attitude of certain sections of industry seems to be, 'Let's get this training over as quickly as possible, and get these people on to production.'

The complaints of the Czech educationists ring familiarly in the ears of their opposite numbers in this country, where there is dissatisfaction with the quality and quantity of industrial training in general, and where it is often said, for example, that the industrial training periods of sandwich courses could be used to much better advantage if industry did its training jobs more conscientiously.

University Education

It is a matter of great pride to the Czechs that they have some 40 institutions of higher education, with over 95,000 full-time students (including 3,000 foreign) and 50,000 'external' students. Five of these institutions are universities proper (Charles, Prague; Comenius, Bratislava; Brno; Olomouc; and Kosice). There are also two economics high schools and fourteen higher technical institutions (including three agricultural colleges) with courses of similar level and duration to those in the universities. In addition there are twelve colleges of education with four-year courses leading to a teaching diploma entitling the holder to teach in the basic schools; and six art colleges (fine and applied arts, music and dramatic arts).

The universities seem to be much pre-occupied with pedagogy, and a high proportion of the graduates become teachers for the secondary vocational and general secondary schools. Charles and Comenius each has an 'Institute of Physical Training and Sport' for training PE

teachers. In the Faculty of Philosophy at Comenius (with as many as 70 per cent of its undergraduates women) up to four-fifths of the students may be expected to go into teaching when they graduate. Compared with the universities in this country, those in Czechoslovakia would seem to play a somewhat secondary role in research. This is mostly undertaken by the various research institutes of the Academy of Science.

Candidates for university entrance must have taken the 'maturity', and have a recommendation from their secondary school. In addition, there are entrance examinations set by the faculties to which application is made. The number of undergraduates in any branch of study is carefully planned from year to year to suit the requirements of the national economy. (The same is true for entrants to secondary schools of all kinds, and for the apprentice schools.) The principle is strictly adhered to that every graduate must be employed in the field for which he has been trained. In general, the State insists that some two-thirds of university places shall be used to train scientists and technologists, the remaining one-third for all other categories.

As might be expected, the needs of the national economy and the aspirations and desires of the students do not always match. The interests of students in the humanities is still much greater than that in technical subjects—in the general secondary schools the mathematics-physics streams are filled only with difficulty, and there are still insufficient good students to fill all the places at the higher technical institutions, while non-technical faculties have insufficient places to cope with the number of students applying. Efforts are made during the period of secondary education to interest students in the less popular branches of higher education—a process known as 'gentle persuasion'—but the position remains that the non-technical faculties seem to be able to fill all available places from a wide selection of good quality students, while the technological faculties have to select from a much narrower range of applicants.

For example, the Faculty of Electrical Engineering at the Czech Technical University, Prague, can offer some 850 new places a year to undergraduates. In 1964/65 there were only 950 applicants for places, and of these only 650 were thought worthy of acceptance. Even then something between 18 and 20 per cent dropped out at the end of the first year. The Faculty of Mechanical Engineering at the same institution filled all its available new places (about 1,000) from a total number of applicants not much greater, but had a 40 per cent wastage at the end of the first year.

In general, the higher institutions are dissatisfied with the products of the secondary schools (just as the secondary schools are critical of the products of the basic schools). The standard reached in mathematics is particularly criticised, and the higher institutions are generally called upon to provide special courses for first-year undergraduates to help them overcome this and other difficulties.

Most university entrants come from the general secondary schools. With rare exceptions all places in arts faculties are filled from this source, but the proportion of general secondary students in technological faculties is much lower, as students from the secondary vocational schools naturally enrol in these. About one-half of general secondary school leavers who wish to go on to higher education are unable to do

so because of the shortage of arts places. A number of such students transfer to the secondary vocational schools, after taking the 'maturity', to take a two-year 'conversion' course in specialist technical subjects. This enables them to take up jobs in industry as higher technicians, or go on to a higher technical institution. An increasing number of general students are converting to technology in this way.

A course leading to a first-degree normally lasts five to six years at a university, or at a higher technical institution where the degree is that of 'engineer.' Three years post-graduate study and project work, plus a thesis, leads to the higher degree of 'candidate in science.' A further higher degree of 'doctor of science' is bestowed thereafter for an appropriate piece of original research work. Graduates in any subject may study for these higher degrees; 'science' in this context signifies *wissenschaft* rather than natural or applied science.

Teacher Training in Czechoslovakia

Girls who intend to be day nursery and kindergarten teachers qualify by taking a four-year course to 'maturity' at a secondary vocational school for nursery school teachers. The four-year post-'maturity' course at a college of education produces teachers qualified to teach at basic schools and apprentice schools. Teachers in secondary general and vocational schools are required to be graduates of a university or other institution of higher education.

There is something of a teacher shortage in Czechoslovakia, and a substantial number of existing teachers are called upon to work overtime, sometimes on school work if their own schools happen to operate a 'double shift' system, but mostly on teaching in the part-time classes for employed persons. It appears that this overtime is not unwelcome to the teachers concerned, as it enables them to augment salaries which are, by British standards rather low, despite an increase in 1966. There is also some dissatisfaction with the general quality of the teaching force, and discussions are going on with a view to introducing a system of compulsory in-service refresher training.

There is also some concern in Czechoslovakia about the quality of the instructors employed in the apprentice training centres to handle the practical training element of the combined education/training apprenticeship programmes. In theory, the standards looked for from instructors are very high. Ideally, the instructor should, himself be a senior 'qualified worker,' with at least ten years practical experience in the occupation concerned after having gained the certificate of apprenticeship. He should also have gained the 'maturity' after a part-time course of secondary education, and successfully completed a pre-service two-semester instructor training course at a regional institute of pedagogy. In practice, very few of the existing body of instructors meet these standards, and those who have had any instructor training at all have had it by way of a short in-service course.

Keeping in Touch

School–University co-operation

University of Birmingham

For some years now the University of Birmingham has arranged in every other year a one-day conference with headmasters and headmistresses, or their representatives, in the West Midlands. About 250 heads are invited and on an average some 150 attend.

The last two conferences have discussed the non-academic aspects of preparation of sixth formers for university; the working of the central admissions scheme; reorganisation of secondary education on the comprehensive principle and its possible effect on universities; the Schools Council proposals for the sixth form curriculum; and new patterns of courses in the University.

In April this year for the first time a residential conference was held with headmasters and headmistresses from outside the Midlands, in University House, a mixed hall of residence. About thirty-five heads from places as far afield as Yorkshire, Lancashire and London attended, together with about the same number of representatives from the University; the Midlands branches of the Associations of Headmasters and Headmistresses were also represented.

An important aspect of this conference was that on the second day, in place of a formal programme, admissions tutors and other members of the academic staff formed panels covering groups of subjects and held informal discussions with heads. This approach was regarded as valuable in that it enabled answers to be obtained to questions which it would have been difficult to raise in a full session.

It is intended to hold, on alternate years, a conference for heads from the Midlands area and a residential conference in the intervening years for heads from further afield.

The University set up, in 1963, a panel of members of the academic staff who are available to visit schools to talk to sixth formers about university life in general and admissions in particular; a letter is sent periodically to some 300 schools letting them know about this arrangement. As a result, more than 150 schools have been visited by request, by members of this panel. These visits have taken different forms. Sometimes they are undertaken by a group of two or three members of staff covering a range of subjects, on other occasions the visits have been by single members of the staff; frequently two or more schools combine to hold a joint meeting. It has been found valuable to invite parents as well as sixth formers to these meetings.

Members of the staff who make these visits do not do so to speak about Birmingham in particular; they try to cover university problems in general and although each member belongs to a particular discipline within the University he is equipped to discuss general topics such as admissions requirements, subjects which are not taken in schools, and the many diverse aspects of university life.

The agenda for these conferences is drawn up after meetings of a liaison committee. On the schools side this comprises representatives of the Midlands branches of the Association of Headmasters and of Headmistresses, and on the University side the Vice-Chancellor, the Registrar, and the Dean of each Faculty or his nominees. The liaison committee normally meets once a year; its meetings are informal. In addition to the preparation of the conference agenda they enable matters of common concern to be discussed.

Finally, there is the Solstice Society. This held its first meeting on June 21, 1966. This is basically a dining club which meets once a term. Its membership comprises an equal number of University staff and headmasters, eighteen of each elected by their colleagues. After dinner a speaker introduces a topic relating to School–University co-operation, for discussion.

Trend-setter?

Degree in Communications and Linguistics

University of Aston

The first group of undergraduates to take the new honours degree course in communications and linguistics, at the University of Aston, is now half-way through its period of study. The students, whose background is in some cases arts at 'A' level, and in others science, are reading for the degree over a period of four years.

The new course is designed to give them an appreciation of the logical structures of natural and numerical language as well as a practical command of a foreign language. Basic qualifications needed to take the course are five subjects in GCE, two at 'A' level; these must include both German and mathematics, either or both at advanced level.

One dimension of communication is a matter of electronic equipment of various kinds, from the telephone to the computer, the other involves relationships between individuals or groups by spoken and sometimes unspoken language.

All the processes of human communication are interwoven closely with one another, but language in some form is basic to them all, and it is this which is the central focus of the course.

Hence the course seeks to take into account the two dimensions of language, considering it firstly as a system of signs which are inter-related and which can be combined into sentences and larger units according to conventions which we call syntax and grammar; secondly as a tool in use. The process of this integration is via specialist studies in mathematics, logic and the philosophy of language.

Philosophy studies centre on logic and linguistics analysis; mathematics covers advanced statistical and computer techniques; German studies involve an ability to speak the language as well as a study of German culture and thinking.

During the first year of the course, emphasis is placed on analysis and the acquisition of language skill. Selected studies are made in the philosophy of language involving a consideration of the logic and structure of language, the first year also covers mathematical logic; and the calculus. In the second year logical studies and computer mathematics follow the same general pattern as before and more attention is focused on abstract language.

During the third year of the course, students will live and work in Germany and will each undertake the study of some aspect of German society. In the final year of the course, earlier syntactic and semantic studies are deepened and related, and foreign language studies are concentrated on specialised communication in science and technology.

The practical aim of the course is to educate the student not only in the expertise of a foreign language, so that he will understand the technical jargon of various specialities, but to give him an overall understanding of communications processes and an appreciation of the potential and limitations of the electronic computer as a tool of society.

In Response To . . .

Bachelors of Education

Joseph Hill, Deputy Principal, Loughborough College of Education writes:

While Mr J. F. Porter deserves our thanks for his useful article on Bachelors of Education in your last issue, he has failed to draw attention sufficiently to the adverse side of this new development in teacher training. It is the purpose of this letter to sketch in the darker side of the picture.

First of all, we must always keep in mind the purpose of a college of education. This is, *tout court*, to train teachers, and it is not altered by altering the name from training college to college of education. And since most of the students in these colleges will teach in primary schools, the purpose can be still further narrowed down

for most of them. The same function is performed for physicians by the medical school of a university. And, as we should not expect such a medical school to instruct its students also in such subjects as English Literature, mathematics, French or Russian, the question may fairly be raised whether such subjects should form part of the curriculum of a college of education and, if so, how far should they be taken. Clearly, if the teacher when trained will find himself/herself required to teach any subject, then there is a case to consider whether the college should give instruction in it, always remembering, of course, that already the student may have spent 13 years (in the case of English or mathematics) or at least 7 years in the case of the other subjects, on learning them already and that, for the age-group with which he/she is likely to be concerned, the knowledge already acquired will almost certainly be more than adequate. This is particularly true, of course, of the infant teacher, but it is equally applicable to junior school teachers and to most of those who will go out as teachers into secondary modern schools and the less gifted and lower streams of comprehensive schools.

Most of those who read the above paragraph will go no further, dismissing its author as completely illiberal and desirous of reducing the teacher to a mere technician. They will claim that a college of education should also be concerned with the education of its students. With this I agree, provided that, before entering upon a discussion as to the content of that education, we first get a definition of an educated person. What worries me is the bland and completely unverified assumption that an educated person is one who knows a great deal about one or two subjects. This is the assumption on which the whole philosophy of the B.Ed. is based in many universities. The result has been (*a*) to increase the amount of time devoted to academic work and reduce that devoted to the actual practical needs of the teacher, and (*b*) to import into predominantly practical subjects like physical education and arts and crafts a mass of irrelevant theoretical material in order to make them academically respectable. The effect of this is quite alarming, particularly when it is associated with the fact that, in response to the demands of the university the academic subjects themselves, which used to be taught in a way that made them directly relevant to the work of the teacher, have been so loaded with more advanced material that they are losing much of the relevance which they used to have.

It is particularly unfortunate that a number of universities have made the B.Ed. into a three-subject degree; for this means for the 'primary' student an intolerable increase in work and a corresponding reduction in time which could be devoted to formal and informal contacts with schools; all this apart from the need to enter fully into the life of a residential institution and to take offices in clubs and societies. It is often forgotten that the secretaryship of a college club can take up a great deal of a student's time and that that time is very well spent by an aspiring teacher. Students in colleges of education are also increasingly forming contacts with the local people, helping with projects for the aged and infirm, and the like. All this kind of valuable experience will be nipped in the bud for B.Ed. candidates. There should be leisure times also for young minds to grow by contacts with other minds.

The danger of a split in the community, which Mr Porter touches on, is very real. To satisfy the demands of the university that I know, there is selection for the B.Ed. course on entrance, a further selection at the end of year one and a final selection with the examination for Part I of the degree at the end of year two. The result has been in one college to split the college several ways, and eventually less than 50 per cent of the originally selected group got past Part I. From the point of view of the cohesiveness of a college, this is deplorable, and with this in mind, it seems a better plan to let all students study together up to the certificate stage and qualify on the certificate results for a further B.Ed. year. With such a system (practised, I believe, at Sheffield), the disappointed ones would, at any rate, be out of college.

I believe it was a big mistake ever to entrust the graduation of teachers to the universities, and would prefer the job to have been handed over the the CNAA so that a unified plan for all student teachers in the colleges of education could have been worked out. This would have enabled the rationalisation of courses, for it is manifestly absurd and costly also that, as happens in most colleges, a subject is being taken for B.Ed. by a small handful of students in order that the college may proudly claim that all students admitted, whatever their choice of subject may be, will have a chance at the B.Ed. degree, provided that they can matriculate. Moreover, the universities are so independent that they will not get together, as they ought to have done in the first instance, to produce a common kind of degree for students in colleges of education. The result is already an unhappy difference between the honours B.Ed. at some universities and the general B.Ed. at others; and, as this affects salaries, it could, and almost certainly will, affect the recruitment of different colleges.

J. F. Porter writes:
Mr Hill's letter illustrates the tension between the educative and the professional functions of the colleges. The article to which he refers was an attempt to show that these functions were not mutually exclusive. Indeed, the best colleges will be those which manage to combine these purposes and produce well-educated teachers.

The colleges have not gone to the CNAA for their degrees—they have chosen to strengthen the real links with people and institutions that have already played an active part in developing the certificate in the three-year course.

Some universities have been restrictive in their attitudes and some colleges have succumbed too easily to the first sign of critical appraisal. What is necessary now is to work continuously for the best solution for the students and for the independent growth of the colleges in which they work. I hold the view that real interaction across the binary gap is essential for the health of higher education as a whole.

Reviews

Hope for the Handicapped. A Teacher's Testament

by Jessie E. Thomas
The Bodley Head 25s.

The author of this book trained as a teacher during the closing years of the last century; her book is a personal record of a lifetime of teaching spent in the service of the former London County Council. After a few years in elementary schools in the south of London, she secured a post in a school for physically handicapped children. She had, as she puts it, 'reached (her) own country,' and from then until the close of the Second World War—indeed thereafter, for she continued for some years as a home teacher of children too handicapped to go to school—Mrs Thomas dedicated herself to teaching the handicapped.

This book is an important social and educational record of the early years of the twentieth century until the end of the Second World War. In the early years, many of her handicapped pupils were brought to school in horse-drawn ambulances; rickets, with its consequent deformities, was widespread; tuberculosis, osteomyelitis and poliomyletis, common. Some severely handicapped children at that time received no education at all, for their problems were considered too severe for any school to handle. Surgical appliances had to be provided largely by voluntary agencies such as the Invalid Children's Aid Association, which 'put down the terrifying cost for new apparatus so that the child could have it at once, and then collected the weekly payments of 3d. or 6d., so hard to keep up that often one such aid was outgrown, outworn, or needing costly repairs and the cost of a new one was inevitable before the old one was paid for'. The task of collecting outworn shoes and garments for needy children was relentless.

Even the 'charge of 4d. a dinner was beyond many a family' and the good offices of the Care Committee had to be sought for families in the direst need. The story of the 1939-45 War years, which take up a major part of the book, is vividly told —the problems of evacuating large numbers of handicapped children, first to a temporary home on the Sussex coast and later, when danger grew and after tragedy had fallen, to the remoter security of a stately home in Cheshire—these events are told with humanity, vividness and understanding.

But this book is above all, a moving personal document. Over and over again we are given flashes of insight into a young teacher learning her art, and gradually finding ways of surmounting problems that might well have daunted others, turning them into opportunities for developing a fuller concept of education. Much of the story is told through brief, but vivid case histories—Leonard, a boy of thirteen, severely handicapped by cerebral palsy, 'who had never been to school at all'; who 'squinted, dribbled . . . his efforts at speech beyond a monosyllable . . . quite incomprehensible'. Mrs Thomas however saw 'entreaty in his wavering eye . . . I took him.' She gave him language, some accomplishments, and above all, brought joy into his restricted life. In doing so, she too gained new insight into the meaning of education itself—'a growth in the comprehension and use of the 3 Rs, of course . . .; but more than this. I was deeply concerned with what sort of men and women my boys and girls would become'. The book is full of portraits of children like Leonard who came into her life and who later often became her friends—Lily, a terribly deprived little girl 'who seemed as if she had cried until she had no tears left'; Carrie, born without hands, who won a scholarship to the Camberwell School of Arts and Crafts, and later 'worked with success and distinction' as a commercial artist, now runs a charming home and drives her own car.

This book, simply and movingly written, is aptly subtitled 'A Teacher's Testament' —the story of one whose teaching career was 'half a century of happy work'. Nobody concerned with education can read this book without fresh understanding of its purpose; teachers of handicapped children in particular will find in it renewed strength and inspiration.

C.W.E.C.

The Girls' Schools

by Kathleen Ollerenshaw

Faber and Faber 30s.

The Public Schools Commission is required to recommend a national plan for integrating the public schools into the state system of education. Dr Ollerenshaw is a strong supporter of the public schools system in general, but because the boys' schools 'have had their case stated many times' she has, in this book, confined the attention to the girls' school. Into the short space of some two hundred and twenty pages she has packed a description of the present day educational system with particular attention to the non-maintained sectors and with brief indications of how each developed and a look towards its possible future. Throughout she is at pains to contrast the needs and opportunities of boys and girls and what she has to say is clearly based on a wide, sympathetic knowledge of schools of all kinds, of the people who work in and for them and, perhaps most important of all, of the young people who study in them and the young adults who are their end product. For the most part she is content to let facts and figures speak for themselves to support her points that parents have a fundamental right, as far as is reasonable, to choose the education they want for their children and that the public schools are making a contribution towards the education of the nation's children which the nation will destroy at its peril. The boarding element is regarded as perhaps the greatest asset which the girls' schools could offer and it is suggested that this might be of special benefit to academically able pupils. In the last chapter, however, Dr Ollerenshaw becomes subjective and offers advice to the schools about courses of action which might help them to survive and to the general public about taking action to preserve freedom. She recognises that the fundamental obstacle to integration is the existence of a type of school to which entry

is based on some form of selection, but is confident that the majority of public schools want to co-operate and that they would welcome 'a greater social mix' among their pupils.

This is a well constructed and readable book. Those who are against, as well as those who are for, the public schools system should find it of interest; the latter will wish they had marshalled their own arguments with equal urgency, the former may, perhaps, think that there might after all be some merit in a cause which inspires such championship. But the question remains: can co-operation on one's own terms be regarded as integration?

M.A.B.

Matthew Arnold

Ed. James Gribble

Bertrand Russell, A. S. Neill, Homer Lane, W. H. Kilpatrick

Ed. Leslie R. Perry

Collier-MacMillan (Educational Thinkers Series *25s. 12s. 6d. paperback*)

These books seem intended to help students in colleges of education by collecting for them extracts from writers described by one of the editors as 'bygone educationalists'—not perhaps the happiest label for A. S. Neill. In each case there is an introductory essay, but thereafter the arrangement of the selections differs significantly. Mr Gribble prints his extracts from Arnold in roughly chronological order, introducing each selection with a useful note on the circumstances or occasion of its publication and supplying cross-references to the relevant parts of his introduction. By these means he supplies the student with at least a coherent introduction to Arnold as an educational thinker. Dr Perry's four assorted 'progressives' are more difficult to handle. His introduction does not tell us enough about them and his extracts, arranged under vague general headings such as Character and Moral Education or Basic Nature of Pupils, are difficult to assimilate. Reference to Summerhill and The Little Commonwealth are scattered about the text, but there is no comment on these institutions other than their founder's description of them. Beacon Hill is not mentioned at all, and we are simply told that the chosen four were all successful as practical educators. Dr Perry's introduction is suggestive about the bases in scientific rationalism, in the concept of evolution and in contemporary psychology from which the progressives mounted their vigorous attack on traditional values and practices. But both introductions seem too much concerned with persuading students to have a proper regard for the analytical powers of contemporary philosophers. It is depressing to be told by one editor that little can be learned from past thinkers until one has acquired from the study of sociology, philosophy and psychology suitable criteria by which to judge them, and from the other that his four thinkers will only yield anything worthwhile to the 'trained and careful' reader. Students of education might be better advised that in Arnold and Russell they will meet adroit and enchanting prose writers, in Lane and Neill unique and fascinating personalities.

D.M.H.

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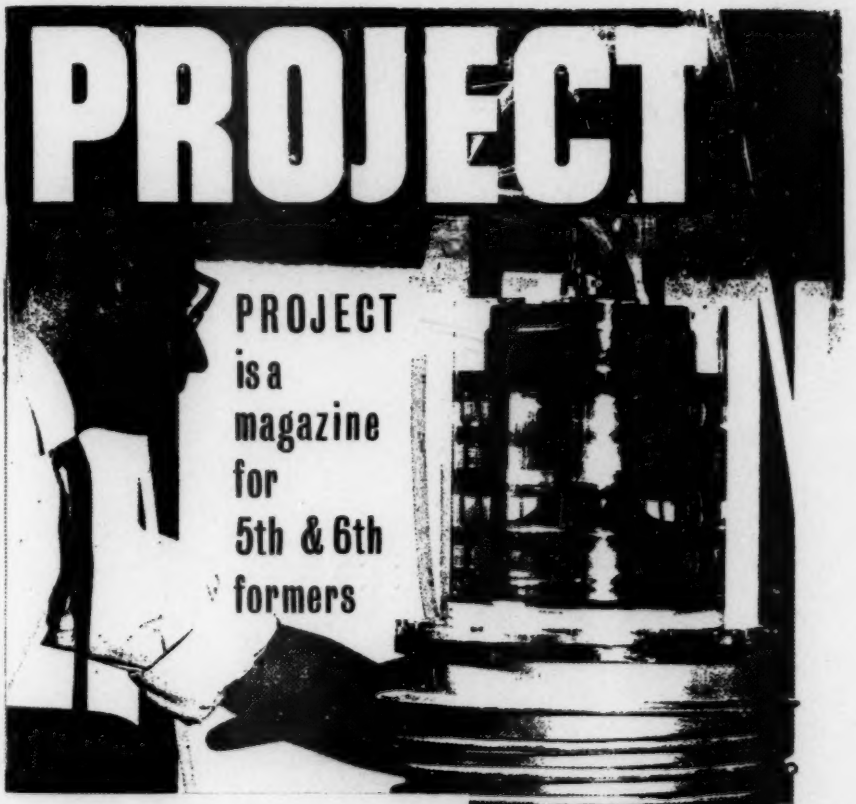

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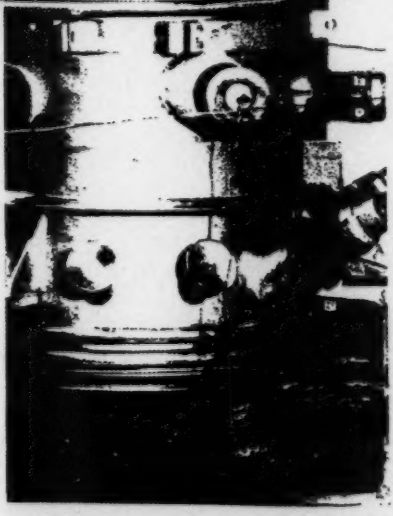

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